

BIOGRAPHICAL INFORMATION: ARJUN G. YODH

See Group Website for more information: <https://web.sas.upenn.edu/yodh-lab/>

EDUCATION

1986 Ph.D., Harvard University, Division of Applied Sciences
1982 M.S., Harvard University, Division of Applied Sciences
1981 B.Sc., Cornell University, School of Applied and Engineering Physics

POSITIONS HELD

1997- Professor of Physics and Astronomy, University of Pennsylvania
1997-06 Professor of Radiation Oncology (Associated), University of Pennsylvania
1993-97 Associate Professor of Physics, University of Pennsylvania
1988-93 Assistant Professor of Physics, University of Pennsylvania
1987-88 Postdoctoral Research Associate with *Harry W. K. Tom*, AT&T Bell Labs
1986-87 Postdoctoral Research Associate with *Steven Chu*, AT&T Bell Labs
1982-86 Research Assistant (RA) with *Thomas W. Mossberg*, Harvard University

HONORS, LEADERSHIP POSITIONS, FELLOWSHIPS, MEMBERSHIPS

James M. Skinner Professor of Science, Endowed Chair, Univ. of Pennsylvania (2000-)
Chair, Department of Physics and Astronomy, University of Pennsylvania (2022-)
Provost's Award for Distinguished PhD Teaching & Mentoring, Univ. of Pennsylvania (2024)
Michael S. Feld Biophotonics Award of the Optical Society of America (now Optica) (2021)
Director, PENN Laboratory for Research on Structure of Matter (LRSM) (2009-20)
Director, NSF Materials Research Science & Engineering Center (MRSEC) (2009-20)
Co-Director, NSF Partnership for Res. & Edu. in Materials (PREM), U Puerto Rico (2009-20)
Elected *Member-at-Large*, Medical Physics Group (GMED), APS (2020-23)
Elected *Electorate Nominating Committee*, AAAS (2017-20)
Alexander von Humboldt Senior Research Award, Heinrich-Heine-Un. of Düsseldorf (2015-18)
Raymond and Beverly Sackler Lecturer, Tel-Aviv University (2015-16)
Visiting Professor, École Supérieure of Industrial Physics & Chemistry (ESPCI), Paris, (2012)
MRSEC Deputy Director, Laboratory for Research on the Structure of Matter (2004-2009)
Langmuir Lecturer (ACS Division of Colloid and Surface Chemistry, 2006)
Sigma Xi National Distinguished Lecturer in Science (2000-2002)
Fellow, American Association for Advancement of Science (AAAS)
Fellow, Optical Society of America (OSA, now Optica)
Fellow, American Physical Society (APS)
Fellow, American Institute for Medical and Biological Engineering (AIMBE)
Member, *Bioengineering Graduate Group*, University of Pennsylvania
Member, *Materials Science and Engineering Graduate Group*, University of Pennsylvania
Member, *Laboratory for Research on the Structure of Matter*, University of Pennsylvania
Member, *Center for Soft and Living Matter*, University of Pennsylvania
Member, *Institute of Medicine and Engineering (IME)*, University of Pennsylvania
Member, *Abramson Cancer Center*, Hospital at the University of Pennsylvania (HUP)
Co-leader/Member, *Center for Advanced Metabolic Imaging & Precision Medicine*, (HUP)
William Smith Term Chair, University of Pennsylvania 1997-2000

Office of Naval Research Navy Young Investigator 1991-94
Alfred P. Sloan Research Fellow 1991-94
National Science Foundation Presidential Young Investigator 1990-95
AT&T Bell Laboratories Faculty Fellow 1990-93
Lilly Foundation Faculty Teaching Fellow, University of Pennsylvania, 1988-89
U.S. Army Pre-Doctoral Fellowship, Harvard University, 1983-86
Cornell National Scholar, Cornell University, 1977-81
Westinghouse Nationwide Science Talent Search Winner, Top 40, 1977

SELECTED ACTIVITIES

Editor/Editorial Board: *Biomedical Optics Express* (2010-); *Biomedical Engineering Frontiers* (2020-); *Journal of Innovative Optical Health Sciences* (2008-); *Neurophotonics* (2014-17); *Physical Review E* (2002-05). Two Issues (1997) on “Diffusing Photons for Study of Turbid Media,” in *Journal of Optical Society of America A* (fundamental), *Applied Optics* (applied). Guest Editor Special Issues: “Celebrating Britton Chance” in *Journal of Biomedical Optics* (4/2000); Two Issues on “Metabolic Imaging & Spectroscopy” in *Journal of Biomedical Optics* (5/2019), *Molecular Imaging and Biology* (6/2019)

Conference Chair/Co-Chair: *Advances in Optics for Biotechnology, Medicine and Surgery*, (United Engineering Foundation, Kona, Hawaii, August 1999); *Advances in Optical Imaging and Photon Migration*, (Optical Society of America, Miami, Florida, April 2000); *Optical Society of America Biomedical Optics*, (OSA, Miami, Florida, April 2002); *Laser Science/OSA XXII Annual Meeting* (Rochester, NY, Fall 2006); *Optical Imaging & Spectroscopy OSA BIOMED Topicals* (Miami, Florida, 2010); *LRSM 50th Anniversary Celebration* (Philadelphia, PA, 5/2012); *Principal of Condensed Matter (Lubenskyfest)* (Philadelphia, PA, 11/2017); *Workshop on Imaging Biomarkers* (Philadelphia, PA, 2011,12,13,14, 2018); *International Symposium on Metabolic Imaging and Spectroscopy* (Philadelphia, PA, 2013); *88th ACS Conference on Colloid & Surface Science* (Philadelphia, PA, 2014); *2nd Britton Chance International Symposium on Metabolic Imaging and Spectroscopy* (Philadelphia, PA, 2018); *Principles of Quantum Matter (Kanefest)* (Philadelphia, PA, 8/2023); *Franklin Institute Award Symposium - Physics of Soft Matter: Self-Assembling, Responsive, Smart, and Squishy (Weitzfest)* (Philadelphia, PA, 4/2024); *The Duchess of Disorder (Liufest)* (Philadelphia, PA, 6/2024); *3rd Britton Chance International Symposium on Metabolic Imaging and Spectroscopy* (Philadelphia, PA, 2024).

Scientific Consultant/Board: Mallinckrodt Medical (1994-99); NIM Inc. (1994-96); Cytometrix Inc. (1994-98); Nanoselect Inc. (2004-08); Flox Medical (2012-15); Hemophotonics (2012-).

Outside Service (selected): *NRC Committee on Atomic, Molecular & Optical Sciences* (2000-03); Evaluation Committee, *FOM Programme 45 'Waves in complex media'*, Netherlands (2001); Advisory Board for *NIH Optical Resource (P41)* at MIT George Harrison Spectroscopy Lab (2002-2021); Review Panels - Numerous NIH Study Sections, NASA Grant Study Section, NSF Panel Review, Department of Energy Review Panel; External Review Committees (Naval Research Lab Biomaterials Section, Kent State University Chemical Physics Department, Boston University Physics Department); Working Groups (Oak Ridge Neutrons for Soft Matter, NSF-DMR Soft Matter); MRSEC External Advisory Boards (Harvard, Brandeis, Ohio State, NYU), MRL External Advisory Board

(Illinois); Advisory Board for *European Union* ITN project, *BitMap* (Brain Injury & Trauma Monitoring using Advanced Photonics). Advisory Board for *European Union* projects: *BitMap* (Brain Injury & Trauma Monitoring using Advanced Photonics) and Prometeus (Preterm Brain-Oxygenation and Metabolic EU-Sensing: Feed the Brain - Prometeus); Member of Physics Cluster for the Medal Awards of the *Franklin Institute* (2022-present).

Public Lecturing: *Exploring Einstein and Brownian Motion* (2005-6) lecture (with simple lab) to High School Physics Classes (Passaic Valley, Phoenixville, Harriton, Methacton, Susquehanna Township); *Sigma Xi National Lecturer in Science* (numerous lectures, 2000-2002); *Hands-On Research in Complex Systems Summer School*, 7/2009 Sao Paulo, Brazil; *LRSM Science Cafes* - regularly 2011-23 (*Imaging Body with Light, Random Walks, Coffee Rings, Order from Disorder*); *Exciting Science of Chocolate* (3/2014, Atlanta); *Why Light Matters* (10/2015, Franklin Institute, Philadelphia); *Materials & Optics @ the Research Frontier* (7/2016, Penn Wharton China Center, Beijing); *Physics of Chocolate* (9/2022, ICFO, Barcelona).

GRADUATE STUDENT AND POST-DOCTORAL ASSOCIATE TRAINING

For more information about my graduate students and post-doctoral associates, as well as about *undergraduates, K-12 students, teachers who have worked in my group:*

See <https://web.sas.upenn.edu/yodh-lab/people/>.

GRADUATE STUDENT SUPERVISION (PHD ADVISEES)

Current: Michio Tanaka, Alistair Lewis, Charlotte Slaughter, Jesse Elliott, Zaha Shahdad, Ben Pisanty

44 PhD Students (graduation year)

Mohsen Yeganeh (1992), Peter Kaplan (1993), Ming Hsu Kao (1995), Jining Qi (1995), David Boas (1996), Maureen O'Leary (1996), Joseph (Joe) Culver (1997), Anthony (Tony) Dinsmore (1997), William (Bill) Angerer (1998), Xingde Li (1998), Ritu Verma (1999), Vasilis Ntziachristos (2000), Ningping Yang (2001), Keng-hui Lin (2002), Jian Zhang (2003), Yu Chen (2003), Turgut Durduran (2004), Regine Choe (2005), Ahmed Alsayed (2006), Ulas Sunar (2006), Chao Zhou (2007), Jonathan Fisher (2007), Mateusz Bryning (2007), Alper Corlu (2007), Soren Konecky (2008), Daniel Tien-Nang Chen (2010), Erin Buckley (2011), David Busch (2011), Peter J. Yunker (2012), Anindita (Oni) Basu (2012), Meeri Kim (2013), Jennifer Lynch (2014), Matthew (Matt) Alan Lohr (2014), Wesley (Wes) Boehs Baker (2015), Han Yong Ban (2015), Matthew (Matt) Gratale (2016), Zoey Davidson (2017), Jeff Cochran (2018), Tiffany Ko (2018), Wei-shao Wei (2020), Sangoon (Bryan) Chong (2022), Analisa Hill (2022), Sophie Ettinger (2023), Emilie Benson (2023).

POST-DOCTORAL ASSOCIATE SUPERVISION (POST-DOC ADVISEES)

Current: Rodrigo Forti, Tiffany Ko, Yihao Chen, Joe Majeski, Hongting Zhao

60 Post-docs (Final Year at Penn, other *non-physics* affiliations while at Penn)

Jeff Owrutsky (1993, w/R. Hochstrasser), Dinos Gonatas (1995, w/J. Leigh), Louis Jahn (1994, w/R. Hochstrasser), Zhijiang Sun (1995, w/R. Hochstrasser), David Cook (1996, w/R. Hochstrasser), Robert Danen (1998, w/NIM Inc.), Eric Weeks (1999), Teodor Vulcan (1999,

w/Radiation Oncology), John Crocker (2000), Cecil Cheung (2000), Michael Solonenko (2000, w/Radiation Oncology), Monica Holboke (2000), Subrata Sanyal (2001), Joe Culver (2001), Alison Slemp (2001, w/D. Fraker), Rex Cheung (2002, w/Radiation Oncology), Joe Giammarco (2002), Xavier Intes (2003, w/B. Chance), Peter Mach (2002, w/P. Wiltzius, Lucent), Zvonimir Dogic (2003), Jean-Christophe Loudet (2003), Hsing-wen Wang (2005, w/Radiation Oncology), Na Young Ha (2006), Mohammad Islam (2006), Kijoon Lee (2007), Guoqiang Yu (2007), Larry Hough (2006), Yilong Han (2007), Ahmed Alsayed (2008), Regine Choe (2010), Zexin Zhang (2010), Qi Wen (2011, w/P. Janmey), Ke Chen (2011), Rickson Mequita (2011), Yalin Ti (2011, w/T. Zhu, HUP), Erin Buckley (2012, w/D. Licht, CHOP), Saurav Pathak (2014), Malavika Chandra (2014), Joonwoo Jeong (2015), Ye Xu (2015), Sophie Chung (2015), Tim Still (2015), Han Ban (2016), Venki Kavuri (2016), Ashwin Parthasarathy (2016), Wesley Baker (2017), David Busch (2017, w/D. Licht, CHOP), Karla Bergonzi (2019 w/A. Kofke, HUP), Angel Martinez (2019), Jeff Cochran (2019), Lian He (2019), Alexis de la Cotte (2020), Xiaoguang Ma (2020), Chandan Kumar Mishra (2021), Brian White (2021, CHOP), Yihong Ong (2021, HUP), Alec Lafontant (2021, w/W. Baker CHOP), Lin Wang (2022), Analisa Hill (2023), Sanghoon (Bryan) Chong (2023).

UNDERGRADUATE STUDENT TRAINING (UGs IN YODH LAB)

PENN Undergraduates (79) (* UGs who Co-authored Paper and/or wrote Thesis)

Manoj Aggarwal (Penn, 1996), Ishtiaq Alam (Penn, 1997-98), Todd Allen (Penn, 2016-17), John Bartel (Penn, 2008), Daniel Bergey* (Penn, 2002), Lee Burwasser (Penn, 2009), Chuck Chung (Penn, 1992-93), Brian J. Cope (Penn, 2000, 01), Rachel Courtland* (Penn, 2000), Cem Dedeaga (Penn, 2007-08), Turgut Durduran* (Penn, 1996-97), Sarah Fletcher (Penn, 2007), David Freifelder (Penn, 2015), Daniel Friedman* (Penn, 2014), Nikhil Gangoli (Penn, 2021), Raman Ganti* (Penn, 2012-13), Nikos Georgiades* (Penn, 1990-91), Vanjessica Gladney (Penn, 2012-13), Bob Grimshaw (Penn, 1999), Adam Gross* (Penn, 2014-16), Josh Gruber* (Penn, 2000-01), Michael Haugh (Penn, 2004-05), Chan Hong (Penn, 2018-19), Zhensong Hu (Penn, 2016-17), Min Young Jeong (Penn, 2014), Robert Jones (Penn, 1993-94), Jahred Kallop (Penn, 2001), Helen Kim* (Penn, 2012-14), Timur Kocaoglu (Penn, 2001), Michael Kopinsky (Penn, 2008), Nimay Kulkarni (Penn, 2016), Sean Lake (Penn, 2003-04), Hannes Leipold (Penn, 2013), Sam Lobel* (Penn, 2013), Tara Lorimer (Penn, 2015), Bart Machielse* (Penn, 2014-16), Clara Marty (Penn, 2019), Zigurt Mazumbdar* (Penn, 1998-99), Ariel Michelman (Penn, 2000), David Minkoff* (Penn, 2007-10), Vincent Morano* (Penn, 2015-18), Kevin Muriuki (Penn, 2015-16), Amrita Nag (Penn, 2009-10), Edward Nieh (Penn, 2008), Matthew Osborn (Penn, 2016), Priyanka Parakh (Penn, 2009), Winston Peloso (Penn, 2020-23), Eric Pinter (Penn, 2010), Raghav Puranmalka (Penn, 2008-09), Avinash Rajput (Penn, 2008-09), Nithin Ramachandran* (Penn, 2022-24), Lynne Raynor (Penn, 2019), Enrique Rojas* (Penn, 2002), Jennifer Rouke* (Penn, 1992-93), Dakara Rucker (Penn, 1997-99), Safiya Saha (Penn, 2019), Elaine Saylor (Penn, 2008-09), Steve Schenkel* (Penn, 2009-14), Lee Schroeder* (Penn, 1995-96), Peter Schwab* (Penn, 2010-2014), Michael Shen (Penn, 2019), Andrea Simi (Penn, 2016), Seelig Sinton (Penn, 1998), Chang Su (Penn, 2015), Thad Szabo (Penn, 1992-93), Raman Thadani (Penn, 2019), David Thakker (Penn, 1998), Kimani Toussant (Penn, 1993), Harsh Vishwasrao (Penn, 1996-97), Doug Voet* (Penn, 1995-96), Clara Wang (Penn, w/Wes Baker CHOP, 2023), Michael Warren (Penn, 2005-07), Elizabeth Wayne* (Penn, 2007-09), Amy Wu (Penn, 2001), Hannah Yevick* (Penn, 2007-08), Jeff Zaremba* (Penn, 2004-05), Emily Zhang (Penn, 2022)

Bo Zhou (Penn, 2004).

Non-PENN Undergraduates (93) (*UGs who Co-authored Paper and/or wrote Thesis)

Juan Aguirre (Unidad de Medicina y Cirugia Experimental, Spain, 2011), Sevde Arpaci (Bogazici University, Turkey, 2011), Carl Atkins (University of Sussex, UK, 2016), Soumendra Banerjee (Cornell, 2001), Blandine Barabé (Grenoble INP - Phelma, France, 2014), Samy Belbegra (Temple, 2019), Gabriel Benjamin-Fernandez (Swarthmore College, 1995), Joshua Boehm, (Case Western Reserve University, 2001), Zachery Brown* (Saint Joseph's University, w/Piotr Habdas, 2015-16), Yaa Bruce (Harvard, 2002), Lauren Chaby (Clarkson University, 2008), Matt Colagreco (West Chester University, w/Kevin Aptowicz, 2010,11), Carrie Davis (University of Notre Dame, 2021), John Mike Devany (St. Joseph's University, w/Piotr Habdas, 2011), Mahima Devarajan (Case Western University, 2017), Connie Dong (University of Minnesota, 2015), Pouneh Fazeli (Harvard, 1995), Daniel Flynn (St. Joseph's University, w/Piotr Habdas, 2011), Sean Gossin (West Chester University, w/Kevin Aptowicz, 2008,09), Audrey Green (Rutgers University, 2013), Kaitlin Griffiths (Temple University, w/Dan Licht, 2015-16), Quoc Trung Nigel Van Ha (Swarthmore College, 2018), Kasey Hanson* (Alfred University, 2013), Emily R. Hudson (Swarthmore College, 2015), Earl Hughes (Temple University, 2015), Daniel Imaizumi (New College, Florida, 1997), Martin Iwanicki* (St. Joseph's University, w/Piotr Habdas, 2011,12,13), Jharna Jahnnavi (Haverford College, 2018), Richard Janowski (West Chester University, w/Kevin Aptowicz, 2015), Jane Jiang (Queen's College, NYC, 2016), Charles Jouaneh (Rhode Island University, 2023), Jessica M. Jowdy (Swarthmore College, 2013), Alpha Kamara (Community College of Philadelphia, 2010), Jonathan Kanatous (West Chester University, w/Kevin Aptowicz, 2007,08), Steve Kane (Haverford College, 1989-90), Clara Karastury (Northeastern University, 2018), Jaka Katransik* (University of Ljubljani, Slovenia, 2011-2012), Camron Klotz (Rowan University, 2021), Aissia Koffi (Howard University, w/Wes Baker at CHOP, 2023), Laura Laderman (Swarthmore College, w/Peter Collings, 2012-13), Andrzej Latka* (Saint Joseph's University, w/Piotr Habdas, 2007-08), Charles Laurans (Yale University, 1998), Andrew Levitt* (University of Toronto, 2000), Michael Leyman (Drexel University, 2011-13), Scott Luedtke (University of Illinois, 2012), Mina Mandic (Swarthmore College, 2022), Rachael Mansbach (Swarthmore College, 2010), Ryan Margolis (West Chester University, w/Kevin Aptowicz, 2010), Lisa Mariani (St. Joseph's University, w/Piotr Habdas, 2011), William Marshall (University of South Carolina, 2019), Catherine Martlin (Swarthmore College, 2012), Giselle Matlis (Drexel, 2019, 2022), Joe Matteo* (Lehigh University, 1997-98), Matthew Mawhinney (Saint Joseph's University, w/Piotr Habdas, 2010), Julia Mayer (West Chester University, w/Kevin Aptowicz, 2013), Miranda Mazzio (Saint Joseph's University, w/Piotr Habdas, 2017-18), Sarah Mburu (Cornell University, 2012), Matthew Menga (Temple, 2004), Julien Menko* (Haverford College, 2012-2014), Tinashe (Harry) Mubvuma (Swarthmore College, 2012), Samer Nashed (Swarthmore College, w/Peter Collings, 2015), John Napp* (Caltech, 2011), Kenneth Nieser (Swarthmore College, w/Peter Collings, 2012-13), Timothy Ogalla (Swarthmore College, w/Peter Collings, 2018), Per Olef* (Swarthmore College, 1990-91), Patrick O'Neill (UC Santa Barbara, 2003), Nicholas Ordenez (Stephens Institute of Technology, 2017), Gabriel A. Calderon Ortiz* (University of Puerto Rico, 2014), Luis R. Rodriguez Ortiz (University of Puerto Rico, 2011), Michelle Otte (Lockhaven University, 2015), Daniel M. Palmer (Swarthmore College, 2014), Sebastian Hurtado Parra (Saint Joseph's University, w/Piotr Habdas, 2014), Anthony Peng (Cornell, 2002), Angelo Porcu (University of Puerto Rico, Humacao, 2019, 2021), Margaret Regan (Swarthmore College, w/Peter Collings, 2012-13), Jennifer Rochlis (Mt. Holyoke College, 1993), Andrew Rouff

(Union College, 2013), Michael Ryan (West Chester University, w/Kevin Aptowicz, 2013-14), Christopher Rajiv Sue-Wah-Sing (Rowan University, 2018), Vishnu Srinivasan (Johns Hopkins University, 2023), Jesse Taylor (Calvin College, 2006), Nathaniel Thorne (University of the Sciences, 2011), Ran Tu (Juniata College, 2005), Rodrigo de Castro Vianna Barbosa (Toulouse (France), 2010), Janet Weaver (William & Mary, 1993), Kayla (Kathryn) Winters (Georgetown University, 2022), Maddie Winters* (Guilford College, 2011-13), Derek Wong* (Haverford College, 1996-97), Serena Woods (Norfolk State University, 2008), Laura Zemany* (Harvard, 1995), Xingda Zhai (Swarthmore College, 2011), Xingyu (Alex) Zhang (Swarthmore College, 2011), Yikang Zhang* (Peking University (PKU), China, 2017).

PATENTS

Fiber optic flow and oxygenation monitoring using diffuse correlation and reflectance, Floyd, T.F., Yodh, A.G., Mesquita, R.C., United States Patent 11,478,151, October 25, 2022.

Pressure Modulation, Motion Detection, Individualized Geometry, and Improved Optic-Skin Coupling to Improve Longterm Clinical Monitoring with Diffuse Optics, Busch, D.R., Parthasarathy, A.B., Baker, W.B., Chandra, M., Mesquita, R.C., Licht, D.J., Yodh, A.G., United States Patent 10,827,976, November 10, 2020.

Probes and pressure modulation algorithms for reducing extra tissue contamination in hemodynamic measurement, Wesley B. Baker, Arjun G. Yodh, David R. Busch, Jr., Ashwin B. Parthasarathy, Rickson C. Mesquita, Malavika Chandra, United States Patent 10,342,488, July 9, 2019.

Fiber Optic Flow and Oxygenation Monitoring using Diffuse Correlation and Reflectance, Floyd, T.F., Yodh, A.G., Mesquita, R. C., United States Patent 10,064,554, September 4, 2018.

Coregistration and Analysis of Multi-modal Images Obtained in Different Geometries, Azar, F.S., Yodh, A.G., Choe, R., Lee, K., United States Patent 9,251,585, February 2, 2016.

Optical Measurement of Tissue Blood Flow, Hemodynamics and Oxygenation, Yodh, A.G., Greenberg, J.G., Yu, G., Detre, J.A., Durduran, T., Burnett, M.G., Mohler, III, E.R., Quon, H., Hahn, S., United States Patent 8,082,015, December 20, 2011.

Extravasation Detection Apparatus and Method Based on Optical Sensing, Culver, J.P., and Yodh, A.G., United States Patent 6,487,428, November 26, 2002.

Systems and Methods for Imaging Fluorophores, A.G. Yodh, B. Chance, M.A. O'Leary, D.A. Boas, X. Li, 6,304,771, October 16, 2001.

Imaging Spatially Varying Dynamic Media with Diffusing Correlation Waves, Boas, D.A., and Yodh, A.G., United States Patent 6,076,010, Jun. 13, 2000.

Object Imaging Using Diffuse Light, Yodh, A.G., Chance, B. Boas, D.A., O'Leary, M.A., United States Patent 5,917,190, June 29, 1999.

Arrangement and Method to Apply Diffusing Wave Spectroscopy to Measure the Properties of Multi-Phase Systems, as Well as Changes Therein, de Kruijff, C.G., Grotenhuis, E. Ten, Weitz, D.A., Nishimura, G., Yodh, A.G., EP 0,947,822 A1, February 4, 1998.

PATENTS PENDING / PATENT DISCLOSURES

Non-invasive cerebral monitoring and cerebral metric-based guidance for medical procedures, Kilbaugh, T., Ko, T., Mavroudis, C., Licht, D., Yodh, A., Berg, R., Morgan, R., Sutton, R., Baker, W., Publication #US 20230000362A1, January 5, 2023.

Method and Systems for Photodynamic Therapy Calculations, Zhu, Timothy, Yodh, A.G., Publication # 20220001193, November 6, 2019.

System and Method for Coregistration and Analysis of Nonconcurrent Diffuse Optical and Magnetic Resonance Breast, Azar, F.S., Yodh, A.G., Publication # 20080292164, November 27, 2018.

Carbon Nanotubes: High Solids Dispersions and Nematic Gels Thereof, Yodh, A.G., Islam, M., Ahmed, M., Alsayed, A., Claimed: P2952 (U.S. Provisional Application 60/409,821, filed Sept. 10, 2002) and P2984 (U.S. Provisional Application 60/419,882, filed Oct. 18, 2002)

Single Wall Nanotube Composites, Yodh, A.G., Islam, M.F., Bryning, M.B. (U.S. Patent Application No. 20060293434, December 28, 2006)

Processes and Applications of Carbon Nanotube Dispersions, Yodh, A.G., Islam, M.F., (U.S. Patent Application No. 20100247381, filed June 6, 2005)

TEACHING ACTIVITIES (PRIMARY COURSES)

Since 1988 I have taught undergraduate and graduate courses at the University of Pennsylvania. This teaching activity includes the following.

1. **Physics 101 / Physics 102** (in current numbering system, **Physics 0101 / Physics 0102**). This *Introductory Physics* series is taken primarily by undergraduates interested in a career in medicine. **Physics 101** is largely *Mechanics*, and **Physics 102** is largely *Electricity and Magnetism*, with additional materials in *Optics, Thermodynamics, etc.*
2. **Physics 008** (in current numbering system, **Physics 0008**). This is an *Introductory Physics for Architects*. **Physics 008** covered *Mechanics* (including statics), and other topics such as *heat transfer, materials, optics*, which were advised by Architecture faculty.
3. **Physics 230** (in the current numbering system, **Physics 1230**). This Sophomore Level physics course is for aspiring majors. A central topic in the course is *Vibrations and Waves*. More recently, our faculty voted to include other topics including *Special Relativity* and *Classical Thermodynamics*, which I have also taught as part of the course.
4. **Physics Lab Lecture** (no longer offered). When I arrived at Penn, a lecture was dedicated to labs for *Introductory Physics* courses such as **Physics 101/102, 150/151**. The course involved a weekly lecture about the lab and about lab-related science in *mechanics, electricity and magnetism, optics*, and *statistical analysis*; the task also involved managing the labs and coordinating activity with the primary lecture course.
5. **Physics 421/529** (in current numbering system, **Physics 4421/5529**). I developed this course from scratch at Penn. It is a *Modern Optics* course intended for Senior Physics Majors, but it became apparent early-on that the course was very valuable for graduate (PhD and MD) students working in optics (*e.g.*, in the Physics and Astronomy department, and in other departments such as Chemistry, Materials Science and Engineering, Chemical Engineering, Electrical Engineering, and Medical Physics). Since many graduate students (PhD, MD) took the course, we augmented the course number to be **Physics 529**. Topics covered include: *introduction to wave phenomena (mainly math background), wave propagation, light interactions with linear media, geometric optics and spectroscopic*

instrumentation, Gaussian beams, diffraction/interference, holography, Fourier optics, coherence, polarization, quantum mechanical light-matter interactions, linear spectroscopy, lasers (introductory), nonlinear spectroscopy (introductory), scattering from fluctuating media. The course sometimes includes informal labs, time-permitting.

6. **Physics 530** (in current numbering system, **Physics 5530**). In essence, this course is **Modern Optics II**; it is advanced with respect to **Physics 421/529**. Topics covered include: *formal solutions of wave equation, Gaussian beams, resonators, guided waves (including coupled guided waves), photonic crystals and metamaterials, quantum mechanical linear and nonlinear spectroscopy, photon echoes, nonlinear optics, nonlinear microscopies, comprehensive theories of the laser, light forces (optical tweezers), light scattering, photon correlation spectroscopies, photon statistics, light diffusion, and more/different depending on time and progress in field.* **Physics 530** connects optics fundamentals to current research in optics and to applications of optics to other fields.

PRIMARY PUBLICATIONS

GOOGLE SCHOLAR: h-index - 120, Citations >51,000

1. Carlson, N.W., Yodh, A.G., and Mossberg, T.W., Standing-wave-induced backward photon echoes in gases, *Physical Review Letters* **51**, 35-38 (1983).
DOI: 10.1103/PhysRevLett.51.35
2. Carlson, N.W., Rothberg, L.J., Yodh, A.G., Babbitt, W.R., and Mossberg, T.W., Storage and time reversal of light pulses using photon echoes, *Optics Letters* **8**, 483-485 (1983).
DOI:10.1364/OL.8.000483
3. Yodh, A.G., Bai, Y., Golub, J.E., and Mossberg, T.W., Grazing-incidence dye lasers with and without intracavity lenses: a comparative study, *Applied Optics* **23**, 2040-2042 (1984).
DOI:10.1364/AO.23.002040, PMID:18212947
4. Yodh, A.G., Golub, J., Carlson, N.W., and Mossberg, T.W., Optically inhibited collisional dephasing, *Physical Review Letters* **53**, 659-662 (1984).
DOI: 10.1103/PhysRevLett.53.659
5. Carlson, N.W., Yodh, A.G., and Mossberg, T.W., Standing-wave induced backward photon echoes in gases, in *Coherence and Quantum Optics V*, Mandel, L., and Wolf, E., eds., Plenum Press, 309-315 (1984).
6. Yodh, A.G., Golub, J., and Mossberg, T.W., Colliding without relaxing: The suppression of collisional dephasing with strong optical, in *Laser Spectroscopy VII*, Hänsch, T.W., and Shen, Y.R., eds., Springer-Verlag, 296-297 (1985).
7. Bai, Y.S., Yodh, A.G., and Mossberg, T.W., Studies of two-level atoms identically prepared by phase- and amplitude-controlled excitation field, in *Laser Spectroscopy VII*, Hänsch, T.W., and Shen, Y.R., eds., Springer-Verlag, 283-284 (1985).

8. Yodh, A.G., Golub, J., and Mossberg, T.W. Collisional relaxation of excited-state Zeeman coherences in atomic ytterbium vapor, *Physical Review A* **32**, 844-853 (1985). DOI:10.1103/PhysRevA.32.844
9. Bai, Y.S., Yodh, A.G., and Mossberg, T.W., Selective excitation of dressed atomic states using phase-controlled optical fields, *Physical Review Letters* **55**, 1277-1280 (1985). DOI:10.1103/PhysRevLett.55.1277
10. Bai, Y.S., Yodh, A.G., and Mossberg, T.W., Resonance fluorescence during phase-controlled transient excitation, *Physics Letters* **111A**, 291-293 (1985). DOI: 10.1016/0375-9601(85)90630-9
11. Lu, N., Berman, P., Yodh, A.G., Bai, Y.S., and Mossberg, T.W., Transient probe spectra in strongly driven atoms and their dependence on initial atomic conditions, *Physical Review A* **33**, 3956-3969 (1986). DOI: <http://dx.doi.org/10.1103/PhysRevA.33.3956>
12. Bai, Y.S., Babbitt, W.R., Yodh, A.G., and Mossberg, T.W., Interaction of transient temporally modulated laser radiation with simple atomic systems, in *Advances in Laser Science I*, Stwalley, W., Lapp, M., eds., American Institute of Physics, 421-424 (1986).
13. Bai, Y.S., Yodh, A.G., and Mossberg, T.W., Time reversal of optical nutation signals, *Physical Review A* **34**, 1222-1227 (1986). DOI: 10.1103/PhysRevA.34.1222
14. Yodh, A.G., Mossberg, T.W., and Thomas, J.E., Multipole-specific, model-independent, velocity-change spectra of collisionally perturbed 3P_1 -state ^{174}Yb atoms, *Physical Review A* **34**, 5150-5153 (1986). DOI: 10.1103/PhysRevA.34.5150
15. Yodh, A.G., Mossberg, T.W., and Thomas, J.E., Orientation and alignment velocity-change spectra obtained by direct inversion of time domain stimulated echo data, in *Spectral Line Shapes VII*, Exton, R.J., ed., Walter de Gruyter Publishers, 579-780 (1986).
16. Chu, S., Mills, A.P., Yodh, A.G., Nagamine, K., Miyake, H., and Kuga, T., Excitation of the $1S$ - $2S$ transition in muonium, in *Laser Spectroscopy VIII*, Persson, W., and Svanberg, S., eds., Springer-Verlag, 28-29 (1987).
17. Chu, S., Mills, A.P. Jr., Yodh, A.G., Nagamine, K., Miyake, Y., and Kuga, T., Laser excitation of the muonium $1S$ - $2S$ transition, *Physical Review Letters* **60**, 101-104 (1988). DOI:10.1103/PhysRevLett.60.101
18. Yodh, A.G., Kaplan, P.D., and Pine, D.J., Pulsed diffusing-wave spectroscopy: high resolution through nonlinear optical gating, *Physical Review B* **42**, 4744-4747 (1990). DOI:10.1103/PhysRevB.42.4744
19. Yodh, A.G., Kaplan, P.D., and Pine, D.J., Pulsed diffusing-wave spectroscopy: pathlength specific observation of speckle fluctuation spectra from dense colloids, in *Ultrafast Phenomena VII*, Harris, C., and Ippen, E., eds., Springer-Verlag, 169-171 (1990).

20. Yodh, A.G., Tom, H.W.K., Aumiller, G.D., and Miranda, R.S., Generation of tunable mid-infrared picosecond pulses at 76 MHz, *Journal of the Optical Society of America B* **8**, 1663-1667 (1991). DOI: 10.1364/josab.8.001663
21. Yodh, A.G., Georgiades, N., and Pine, D.J., Diffusing-wave interferometry, *Optics Communications* **83**, 56-59 (1991). DOI: 10.1016/0030-4018(91)90521-e
22. Yodh, A.G., Kaplan, P.D., and Pine, D.J., Pulsed diffusing-wave spectroscopy in dense colloids, in *Laser Optics of Condensed Matter, vol. 2 of The Physics of Optical Phenomena and Their Use as Probes of Matter*, Garmire, E., Maradudin, A., and Rebane, K., eds., Plenum Press, 307-314 (1991).
23. Yeganeh, M.S., Yodh, A.G., and Tamargo, M.C., Nonlinear spectroscopy of thin epitaxial ZnSe films on GaAs[100], in *Proceedings for 180th Meeting of The Electrochemical Society, Nonlinear Optics and Materials Session*, Phoenix, Arizona, October 13-17, 1991. *Journal of the Electrochemical Society* **138**, 416C (1991). DOI: 10.1103/PhysRevLett.69.3579
24. Kaplan, P.D., Yodh, A.G., and Pine, D.J., Diffusion and structure in dense binary suspensions, *Physical Review Letters* **68**, 393-396 (1992). DOI: 10.1103/PhysRevLett.68.393
25. Yeganeh, M.S., Qi, J., Yodh, A.G., and Tamargo, M.C., Interface quantum well states observed by three-wave mixing in ZnSe/GaAs heterostructures, *Physical Review Letters* **68**, 3761-3764 (1992). DOI: 10.1103/PhysRevLett.68.3761
26. Yodh, A.G., and Tom, H.W.K., Picosecond linear vibrational spectroscopy of CO adsorbed on Cu (111) by phase-sensitive polarization modulation, *Physical Review B* **45**, 14302-14307 (1992). DOI: 10.1103/PhysRevB.45.14302
27. Yodh, A.G., Pine, D.J., Kaplan, P.D., Kao, M.H., and Georgiades, N., Speckle fluctuations and their use as probes of dense random media, *Mol. Cryst. Liq. Cryst. Sci. Technol. Sec. B* **3**, 149-160 (1992).
28. Yeganeh, M.S., Qi, J., Culver, J.P., Yodh, A.G., and Tamargo, M.C., Interference in reflected second-harmonic generation from thin nonlinear films, *Physical Review B* **46**, 1603-1610 (1992). DOI: 10.1103/PhysRevB.46.1603
29. Owrutsky, J.C., Culver, J.P., Li, M., Kim, R., Sarisky, M.J., Yeganeh, M.S., Yodh, A.G., and Hochstrasser, R.M., Femtosecond coherent transient infrared spectroscopy of CO on Cu (111), *Journal of Chemistry and Physics* **97**, 4421-4427 (1992). DOI: 10.1063/1.463884

30. O'Leary, M.A., Boas, D.A., Chance, B., and Yodh, A.G., Refraction of diffuse photon density waves, *Physical Review Letters* **69**, 2658-2661 (1992). PMID: 10046551. DOI:10.1103/PhysRevLett.69.2658
31. Yeganeh, M.S., Qi, J., Yodh, A.G., and Tamargo, M.C., Influence of heterointerface atomic structure and defects on second-harmonic generation, *Physical Review Letters* **69**, 3579-3582 (1992). DOI: 10.1103/PhysRevLett.69.3579
32. Yodh, A.G., Owrutsky, J.C., Culver, J.P., Li, M., Kim, Y.R., Sarisky, M.J., Yeganeh, M.S., and Hochstrasser, R.M., Femtosecond coherent transient vibrational spectroscopy of CO adsorbed on Cu (111), in *Ultrafast Phenomena VIII*, June 8-12, 1992, Antibes, France, Springer-Verlag, 345-346 (1993).
33. Kaplan, P.D., Yodh, A.G., and Townsend, D.F., Noninvasive study of gel formation in polymer-stabilized dense colloids using multiply scattered light, *Journal of Colloid and Interface Science* **155**, 319-324 (1993). DOI: 10.1006/jcis.1993.1041
34. Kao, M.H. Yodh, A.G., and Pine, D.L., Observation of Brownian motion on the time scale of hydrodynamic interactions, *Physical Review Letters* **70**, 242-245 (1993). DOI:10.1103/PhysRevLett.70.242
35. Li, M., Owrutsky, J., Sarisky, M., Culver, J.P., Yodh, A., and Hochstrasser, R.M., Vibrational and rotational relaxation times of solvated molecular ions, *Journal of Chemistry & Physics* **98**, 5499-5507 (1993). DOI:10.1063/1.464899
36. Boas, D.A., O'Leary, M.A., Chance, B., and Yodh, A.G., Scattering and wavelength transduction of diffuse photon density waves, *Physical Review E* **47**, R2999-R3002 (1993). PMID: 9960455, DOI: 10.1103/PhysRevE.47.R2999
37. Yeganeh, M.S., Qi, J., Yodh, A.G., and Tamargo, M.C., Interfacial electronic trap lifetimes studied by the photomodulation of second-harmonic generation processes, *Journal of the Optical Society of America B* **10**, 2093-2099 (1993). DOI: 10.1364/josab.10.002093
38. Kaplan, P.D, Kao, M.S., Yodh, A.G., and Pine, D.J., Geometric constraints for the design of diffusing-wave spectroscopy experiments, *Applied Optics* **32**, 3828-3836, (1993). DOI:10.1364/AO.32.003828
39. Qi, J., Yeganeh, M.S., Koltover, I., Yodh, A.G., and Theis, W.M., Depletion-electric-field-induced changes in second-harmonic generation from GaAs, *Physical Review Letters* **71**, 633-636 (1993). DOI: 10.1103/PhysRevLett.71.633
40. Li, M., Owrutsky, J., Sarisky, M., Culver, J.P., Yodh, A.G., and Hochstrasser, R.M., Vibrational dynamics of condensed phase models studied by ultrafast infrared spectroscopy, in *Time Resolved Vibrational Spectroscopy VI*, Lau, A., Siebert, F., Werncke, W., eds., Springer Proc. Phys. (Springer, Heidelberg-Berlin, 1993).

41. Culver, J.P., Li, M., Jahn, L.G., Hochstrasser, and Yodh, A.G., Vibrational response of surface adsorbates to femtosecond substrate heating, *Chemical Physics Letters* **214**, 431-437 (1993). DOI:10.1016/0009-2614(93)85661-7
42. Kaplan, P.D., Rouke, J.L., Yodh, A.G., and Pine, D.J., Entropically driven surface phase separation in binary colloidal mixtures, *Physical Review Letters* **72**, 582-585 (1994). DOI:10.1103/PhysRevLett.72.582
43. O'Leary, M.A., Boas, D.A., Chance, B., and Yodh, A.G., Re-radiation and imaging of diffuse photon density waves using fluorescent inhomogeneities, *Journal of Luminescence* **60&61**, 281-286 (1994). PMID: 19859209, DOI: 10.1016/0022-2313(94)90147-3
44. Boas, D.A., O'Leary, M.A., Chance, B., and Yodh, A.G., Scattering of diffuse photon density waves by spherical inhomogeneities within turbid media: analytic solution and applications, *Proceedings of the National Academy of Sciences USA* **91**, 4887-4891 (1994). PMID: 88197151, PMCID: PMC43894, DOI: 10.1073/pnas.91.11.4887
45. Yeganeh, M.S., Qi, J., Culver, J.P., and Yodh, A.G., Three-wave-mixing spectroscopy of ZnSe/GaAs (001) heterointerfaces, *Physical Review B* **49**, 11196-11209 (1994). DOI:10.1103/PhysRevB.49.11196
46. Kaplan, P.D., Dinsmore, A.D., Yodh, A.G., and Pine, D.J., Diffuse-transmission spectroscopy: a structural probe of opaque colloidal mixtures, *Physical Review E* **50**, 4827-4835 (1994). DOI: 10.1103/PhysRevE.50.4827
47. Yodh, A.G., Culver, J.P., Li, M., Jahn, L.G. and Hochstrasser, R.M., Adsorbate infrared response following femtosecond metal-substrate heating, in *Ultrafast Phenomena IX*, Harris, C.B., Ippen, E.P., Mourou, G.A., Zewail, A.H. eds, 169-171, Springer Verlag, (1994).
48. Talaat, H., Elissa, L., Negm, S., Burstein, E., Yeganeh, M.S., and Yodh, A.G., Light scattering studies of ZnSe/GaAs heterostructures, *J. Vac. Sci. Technol. B* **12**, 2598-2604 (1994). DOI:10.1116/1.587216
49. Pine, D.J., Weitz, D.A., Zhu, J.X., Durian, D.J., Yodh, A.G., and Kao, M., Diffusing-wave spectroscopy and interferometry, *Macromolecular Symposia* **79**, 31-44 (1994). DOI:10.1002/masy.19940790105
50. Culver, J.P., Li, M., Jahn, L.G., Hochstrasser, R.M., and Yodh, A.G., Femtosecond photoprocesses: adsorbate infrared spectral response following visible pulse metal substrate excitation, in *Laser Spectroscopy and Photochemistry on Metal Surfaces*, Ho, W., and Dai, H-L., eds, World Scientific Publishing Co., Singapore, 542-589 (1995).

51. Qi, J., Angerer, M.S., Yeganeh, M.S., Yodh, A.G., and Theis, W.M., Transverse diffusion of minority carriers confined near the GaAs surface plane, *Physical Review B* **51**, 13533-13537 (1995). DOI: 10.1103/PhysRevB.51.13533
52. O'Leary, M.A., Boas, D.A., Chance, B., and Yodh, A.G., Experimental images of heterogeneous turbid media by frequency-domain diffusing-photon tomography, *Optics Letters* **20**, 426-428 (1995). PMID: 19859209, DOI: 10.1364/ol.20.000426
53. Gonatas, C.P., Leigh, J.S., Yodh, A.G., Glazier, J.A., and Prause, B., Magnetic resonance images of coarsening inside a foam, *Physical Review Letters* **75**, 573-576 (1995). DOI:10.1103/PhysRevLett.75.573
54. Dinsmore, A.D., Yodh, A.G., and Pine, D.J., Phase-diagrams of nearly hard-sphere binary colloids, *Physical Review E* **52**, 4045-4057 (1995). DOI: 10.1103/PhysRevE.52.4045
55. Yodh, A., and Chance, B., Spectroscopy and imaging with diffusing light, *Physics Today* **48**, 34-40 (1995). DOI: 10.1063/1.881445
(Reprinted in Japanese by The Maruzen Co., in the Japanese Physics journal "Parity" pp. 8-17 (Feb. 1996); reprinted in *Advances in Spectroscopy and Lasers*, Bist, H.D., Little, T.S., eds., Tata McGraw-Hill, New Delhi, chapter 6, pp. 119-131 (1997).)
56. Liu, H., Boas, D.A., Zhang, Y., Yodh, A.G., and Chance, B., Determination of optical properties and blood oxygenation in tissue using continuous NIR light, *Physics in Medicine and Biology* **40**, 1983-1993 (1995). DOI: 10.1088/0031-9155/40/11/015
57. Boas, D.A., Campbell, L.E., and Yodh, A.G., Scattering and imaging with diffusing temporal field correlations, *Physical Review Letters* **75**, 1855-1858 (1995). PMID: 88197151, PMCID: PMC43894, DOI: 10.1103/PhysRevLett.75.1855
58. Qi, J., Angerer, W., Yeganeh, M.S., Yodh, A.G., and Theis, W.M., Observation of midgap interface states in buried metal/GaAs junctions, *Physical Review Letters* **75**, 3174-3177 (1995). DOI:10.1103/PhysRevLett.75.3174
59. O'Leary, M.A., Boas, D.A., Li, X.D, Chance, B., and Yodh, A.G., Fluorescence lifetime imaging in turbid media, *Optics Letters* **21**, 158-160 (1996). DOI: 10.1364/ol.21.000158
60. Yodh, A.G., Laser experiments for beginners, Book Review, *Physics Today* **49**, 91-92 (1996). DOI: 10.1063/1.2807546
61. Boas, D.A., Meglinsky, I.V., Zeman, L., Campbell, L.E., Chance, B., and Yodh, A.G., Diffusion of temporal field correlation with selected applications, In Tuchin, V., ed, *SPIE Coherence-Domain Methods in Biomedical Optics*, 2732, 34-36 (1996).
62. Culver, J.P., Li, M., Sun, Z.-J., Hochstrasser, R.M., and Yodh, A.G., Temperature-dependent coupling of low frequency adsorbate vibrations to metal substrate electrons. *Chemical Physics* **205**, 159-166 (1996). DOI:10.1016/0301-0104(95)00376-2

63. Li, X.D., O'Leary, M.A., Boas, D.A., Chance, B., and Yodh, A.G., Fluorescent diffuse photon density waves in homogeneous and heterogeneous turbid media: analytic solutions and applications, *Applied Optics* **35**, 3746-3758 (1996). PMID: 21102772
DOI: 10.1364/ao.35.003746
64. Qi, J., Angerer, W., Yeganeh, M.S., Yodh, A.G., and Theis, W.M., Midgap states observed by nonlinear optical spectroscopy of metal: GaAs junctions, *Applied Surface Science* **104/105**, 188-195 (1996). DOI: 10.1016/S0169-4332(96)00143-2
65. Dinsmore, A.D., Yodh, A.G., and Pine, D.J., Entropic control of particle motion using passive surface microstructures, *Nature* **383**, 239-242 (1996). DOI: 10.1038/383239a0
66. Kao, M.H., Jester, K.A., Yodh, A.G., and Collings, P.J., Observation of light diffusion and correlation transport in nematic liquid crystals, *Physical Review Letters* **77**, 2233-2236 (1996). PMID: 10061892; DOI: 10.1103/PhysRevLett.77.2233
67. Culver, J.P., Li, M., Hochstrasser, R.M., and Yodh, A.G., Vibrational dynamics of low frequency ($<100\text{ cm}^{-1}$) adsorbate motions, *Surface Science* **368**, 9-19 (1996).
DOI: 10.1016/s0039-6028(96)01023-0
68. Boas, D.A., O'Leary, M.A., Chance, B., Yodh, A.G., Detection and characterization of optical inhomogeneities with diffuse photon density waves: a signal-to-noise analysis, *Applied Optics* **36**, 75-92 (1997). PMID:18250649 DOI: 10.1364/ao.36.000075
69. Stark, H., Kao, M.H., Jester, K.A., Lubensky, T.C., Yodh, A.G., and Collings, P.J., Light diffusion and diffusing-wave spectroscopy in nematic liquid crystals, *Journal of the Optical Society of America A* **14**, 156-178 (1997). DOI: 10.1364/JOSAA.14.000156
70. Boas, D.A., and Yodh, A.G., Spatially varying dynamical properties of turbid media probed with diffusing temporal light correlation, *Journal of the Optical Society of America A* **14**, 192-215 (1997). DOI: 10.1364/JOSAA.14.000192
71. Li, X.D., Durduran, T., Yodh, A.G., Chance, B., and Pattanayak, D.N., Diffraction tomography for biochemical imaging with diffuse-photon density waves, *Optics Letters* **22**, 573-575 (1997). PMID: 18183271, DOI:10.1364/OL.22.000573
72. Dinsmore, A.D., Warren, P.B., Poon, W.C.K., and Yodh, A.G., Fluid-solid transitions on walls in binary hard-sphere mixtures, *Europhysics Letters* **40**, 337-342 (1997).
DOI: 10.1209/epl/i1997-00468-4
73. Durduran, T., Yodh, A.G., Chance, B., and Boas, D.A., Does the photon-diffusion coefficient depend on absorption? *Journal of the Optical Society of America* **14**, 3358-3364 (1997). DOI:10.1364/JOSAA.14.003358

74. Dinsmore, A.D., Wong, D.T., Nelson, P., and Yodh, A.G., Hard spheres in vesicles: curvature-induced forces and particle-induced curvature, *Physical Review Letters* **80**, 409-412 (1998). DOI:10.1103/PhysRevLett.80.409
75. Danen, R.M., Wang, Y., Li, X.D., Thayer, W.S., and Yodh, A.G., Regional imager for low-resolution functional imaging of the brain with diffusing near-infrared light, *Photochemistry and Photobiology*. **67**, 33-40 (1998). DOI: 10.1111/j.1751-1097.1998.tb05162.x
76. Dinsmore, A.D., Crocker, J.C., and Yodh, A.G., Self-assembly of colloidal crystals, *Current Opinion in Colloid & Interface Science* **3**, 5-11 (1998). DOI: 10.1016/S1359-0294(98)80035-6
77. Yodh, A.G., Scattered light detects cancer, *Physics World* **11**, 28 (1998). DOI:http://dx.doi.org/10.1088/2058-7058/11/5/29 (1998).
78. Li, X., Chance, B., and Yodh, A.G., Fluorescent heterogeneities in turbid media: limits for detection, characterization, and comparison with absorption, *Applied Optics* **37**, 6833-6844 (1998). DOI: 0.1364/AO.37.006833
79. Verma, R., Crocker, J.C., Lubensky, T.C., and Yodh, A.G., Entropic colloidal interactions in concentrated DNA solutions, *Physical Review Letters* **81**, 4004-4007 (1998). DOI:10.1103/PhysRevLett.81.4004
80. Crocker, J.C., Matteo, J.A., Dinsmore, A.D., and Yodh, A.G., Entropic attraction and repulsion in binary colloids probed with a line optical tweezer, *Physical Review Letters* **82**, 4352-4355 (1999). DOI: 10.1103/PhysRevLett.82.4352
81. Ntziachristos, V., Ma, X.H., Yodh, A.G., and Chance, B., Multi-channel photon counting instrument for spatially resolved near infrared spectroscopy, *Review of Scientific Instruments* **70**, 193-201 (1999). DOI: 10.1063/1.1149565
82. Dinsmore, A.D., and Yodh, A.G., Entropic confinement of colloidal spheres in corners on silicon substrates, *Langmuir* **15**, 314-316 (1999). DOI: 10.1021/la981243w
83. Angerer, W.E., Yang, N., Yodh, A.G., Khan, M.A., and Sun, C.J., Ultrafast second-harmonic generation spectroscopy of GaN thin films on sapphire, *Physical Review B* **59**, 2932-2946 (1999). DOI: 10.1103/PhysRevB.59.2932
84. Durduran, T., Culver, J.P., Holboke, M.J., Li, X.D., Zubkov, L., Chance, B., Pattanayak, D.N., and Yodh, A.G., Algorithms for 3D localization and imaging using near-field diffraction tomography with diffuse light, *Optics Express* **4**, 247-262 (1999). DOI: 0.1364/OE.4.000247
85. Pattanayak, D.N., and Yodh, A.G., Diffuse optical 3D-slice imaging of bounded turbid media using a new integro-differential equation, *Optics Express* **4**, 231-240 (1999). DOI:10.1364/OE.4.000231

86. Zhu, Q., Durduran, T., Ntziachristos, V., Holboke, M., and Yodh, A.G., Imager that combines near-infrared diffusive light and ultrasound, *Optics Letters* **24**, 1050-1052 (1999). PMID: 18073937. DOI: 10.1364/ol.24.001050
87. Verma, R., Crocker, J.C., Lubensky, T.C., and Yodh, A.G., Attractions between hard colloidal spheres in semi-flexible polymer solutions, *Macromolecules* **33**, 177-186 (2000). DOI:0.1021/ma990362v
88. Ntziachristos, V., Chance, B., and Yodh, A.G., Differential diffuse optical tomography, *Optics Express* **5**, 230-242 (1999). DOI: 10.1364/OE.5.000230
89. Zimnyakov, D.A., Tuchin, V.V., and Yodh, A.G., Characteristic scales of optical field depolarization and decorrelation for multiple scattering media and tissues, *Journal of Biomedical Optics* **4**, 157-163 (1999). DOI: 10.1117/1.429902
90. Ntziachristos, V., Yodh, A.G., Schnall, M., and Chance, B., Concurrent MRI and diffuse optical tomography of breast after indocyanine green enhancement, *Proceedings of the National Academy of Sciences USA* **97**, 2767-2772 (2000). PMID: 10706610; PMCID: PMC16004. DOI: 10.1073/pnas.040570597
91. Vulcan, T.G., Zhu, T.C., Rodriguez, C.E., Hsi, A., Fraker, D.L., Baas, P., Murrer, L.H.P., Starr, W.M., Glatstein, E., Yodh, A.G., and Hahn, S.M., Comparison between isotropic and non-isotropic dosimetry systems during intraperitoneal photodynamic therapy, *Lasers in Surgery and Medicine* **26**, 292-301 (2000). DOI: 10.1002/(SICI)1096-9101(2000)26:3<292::AID-LSM7>3.0.CO;2-T
92. Crocker, J.C., Valentine, M.T., Weeks, E.R., Gisler, T., Kaplan, P.D., Yodh, A.G., and Weitz, D.A., Two-point microrheology of inhomogeneous soft materials, *Physical Review Letters* **85**, 888-891 (2000). DOI: 10.1103/PhysRevLett.85.888
93. Li, X., Pattanayak, D.N., Durduran, T., Culver, J.P., Chance, B., and Yodh, A.G., Near-field tomography with diffuse photon density waves, *Physical Review E* **61**, 4295-4309 (2000). DOI: 10.1103/PhysRevE.61.4295
94. Lin, K-H., Crocker, J.C., Prasad, V., Schofield, A., Weitz, D.A., Lubensky, T.C., and Yodh, A.G., Entropically driven colloidal crystallization on patterned surfaces, *Physical Review Letters* **85**, 1770-1773 (2000). DOI: 10.1103/PhysRevLett.85.1770
95. Yodh, A.G., and Tromberg, B.J., Celebrating Britton Chance, *Journal of Biomedical Optics* **5**, 115-118 (2000). DOI: 10.1117/1.429977
96. Holboke, M.J., Tromberg, B.J., Li, X., Shah, N., Fishkin, J., Kidney, D., Butler, J., Chance, B., and Yodh, A.G., Three-dimensional diffuse optical mammography with ultrasound localization in a human subject, *Journal of Biomedical Optics* **5**, 237-247 (2000). PMID: 10938789. DOI: 10.1117/1.429992

97. Owen, R.J., Crocker, J.C., Verma, R., and Yodh, A.G., Measurement of long-range steric repulsions between microspheres due to adsorbed polymer, *Physical Review E* **64**, 011401-1-6 (2001). DOI: 10.1103/PhysRevE.64.011401
98. Griffin, G.M., Zhu, T., Solonenko, M., Del Piero, F., Kapakin, A., Busch, T., Yodh, A.G., Polin, G., Bauer, T., Fraker, D., and Hahn, S.M., Preclinical evaluation of motexafin lutetium-mediated intraperitoneal photodynamic therapy in a canine model, *Clinical Cancer Research* **7**, 374-381 (2001).
99. Intes, X., Chance, B., Holboke, M.J., and Yodh, A.G., Interfering diffusive photon-density waves with an absorbing-fluorescent inhomogeneity, *Optics Express* **8**, 223-231 (2001). DOI:10.1364/OE.8.000223
100. Ripoll, J., Ntziachristos, V., Culver, J.P., Pattanayak, D.N., Yodh, A.G., and Nieto-Vesperinas, M., Recovery of optical parameters in multiple-layered diffusive media: theory and experiments, *Journal of the Optical Society of America A* **18**, 821-830 (2001). DOI: 10.1364/JOSAA.18.000821
101. Culver, J.P., Ntziachristos, V., Holboke, M.J., and Yodh, A.G., Optimization of optode arrangements for diffuse optical tomography: a singular value analysis, *Optics Letters* **26**, 701-703 (2001). DOI: 10.1364/OL.26.000701
102. Yodh, A.G., Lin, K-H., Crocker, J.C., Dinsmore, A.D., Verma, R., and Kaplan, P.D., Entropically driven self-assembly and interaction in suspension, *The Philosophical Transactions of the Royal Society of London A* **359**, 921-937 (2001). DOI: 10.1098/rsta.2000.0810
103. Ntziachristos, V., Hielscher, A.H., Yodh, A.G., and Chance, B., Diffuse optical tomography of highly heterogeneous media, *IEEE Transactions on Medical Imaging* **20**, 470-478 (2001). DOI: 10.1109/42.929613
104. Cheung, C., Culver, J.P., Takahashi, K., Greenberg, J.H., Yodh, A.G., *In vivo* cerebrovascular measurement combining diffuse near-infrared absorption and correlation spectroscopies, *Physics in Medicine and Biology* **46**, 2053-2065 (2001). DOI: 10.1088/0031-9155/46/8/302
105. Lin, K-H., Crocker, J.C., Zeri, A.C., and Yodh, A.G., Colloidal interactions in suspensions of rods, *Physical Review Letters* **87**, 088301-1-4 (2001). DOI: 10.1103/PhysRevLett.87.088301
106. Ripoll, J., Ntziachristos, V., Culver, J.P., Yodh, A.G., and Nieto-Vesperinas, M., The Kirchhoff approximation in diffusive media with arbitrary geometry, *Proceedings of the SPIE - The International Society for Optical Engineering*, **4431**, 134-140 (2001).

107. Yang, N., Angerer, W.E., and Yodh, A.G., Angle-resolved second-harmonic light scattering from colloidal particles, *Physical Review Letters* **87**, 103902-1-4 (2001). DOI:10.1103/PhysRevLett.87.103902
108. Yang, N., Angerer, W.E., and Yodh, A.G., Second harmonic microscopy of single micron-size particles on a substrate, *Physical Review A* **64**, 045801-1-4 (2001). DOI:10.1103/PhysRevA.64.045801
109. Intes, X., Ntziachristos, V., Culver, J.P., Yodh, A.G., and Chance, B., Projection access order in algebraic reconstruction technique for diffuse optical tomography, *Physics in Medicine and Biology* **47**, N1-N10 (2002). DOI: 10.1088/0031-9155/47/1/401
110. Solonenko, M., Cheung, R., Busch, T.M., Kachur, A., Griffin, G.M., Vulcan, T., Zhu, T.C., Wang, H-W., Hahn, S., and Yodh, A.G., *In-vivo* reflectance measurement of optical properties, blood oxygenation and motexafin lutetium uptake in canine large bowels, kidneys and prostates, *Physics in Medicine and Biology* **47**, 857-873 (2002). DOI: 0.1088/0031-9155/47/6/301
111. Mach, P., Wiltzius, P., Megens, M., Weitz, D.A., Lin, K.-H., Lubensky, T.C., and Yodh, A.G., Electro-optic response and switchable Bragg diffraction for liquid crystal in colloid-templated materials, *Physical Review E* **65**, 031720-1-3 (2002). DOI: 10.1103/PhysRevE.65.031720
112. Mach, P., Wiltzius, P., Megens, M., Weitz, D.A., Lin, K.-H., Lubensky, T.C., and Yodh, A.G., Switchable Bragg Diffraction from Liquid Crystal in Colloid-Templated Structures, *Europhysics Letters* **58**, 679-685 (2002). DOI: 209/epl/i2002-00403-3
113. Ntziachristos, V., Yodh, A.G., Schnall, M.D., and Chance, B., MRI-guided diffuse optical spectroscopy of malignant and benign breast lesions, *Neoplasia* **4**, 347-354 (2002). PMID: 12082551; PMCID: PMC1661680, DOI: 10.1038/sj.neo.7900244
114. Durduran, T., Choe, R., Culver, J.P., Zubkov, L., Holboke, M.J., Giammarco, J., Chance, B., and Yodh, A.G., Bulk optical properties of healthy female breast tissue, *Physics in Medicine and Biology* **47**, 2847-2861 (2002). DOI: 10.1088/0031-9155/47/16/302
115. Yodh, A.G., Cheung, C., Culver, J.P., Durduran, T., Greenberg, J.H., Takahashi, K., and Furuya, D., *In vivo* diffuse optical spectroscopy and imaging of blood dynamics in brain, in *Proceedings of the XV International Conference on Laser Spectroscopy*, Snowbird, Utah, June 10-15, 2001, Chu, S., Vuletic, V., Kerman, A.J., and Chin, C., eds., World Scientific, River Edge, NJ (2002).
116. Lau, A.W.C., Lin, K-H., and Yodh, A.G., Entropic interactions in suspensions of semi-flexible rods: short-range effects of flexibility, *Physical Review E* **66**, 020401-1-020401-4 (2002). DOI: 10.1103/PhysRevE.66.020401

117. Zhang, J., Alsayed, A., Lin, K.H., Sanyal, S., Zhang, F., Pao, W.-J., Balagurusamy, V.S.K., Heiney, P.A., and Yodh, A.G., Template-directed convective assembly of three dimensional face-centered-cubic colloidal crystals, *Applied Physics Letters* **81**, 3176-3178 (2002). DOI: 10.1063/1.1516614
118. Culver, J.P., Furuya, D., Durduran, T., Cheung, C., Greenberg, J.H., and Yodh, A.G., Diffuse optical measurement of hemoglobin and cerebral blood flow in rat brain during hypercapnia, hypoxia and cardiac arrest, *Advances in Experimental Medicine and Biology* **510**, 293-297 (2003). DOI: 10.1007/978-1-4615-0205-0_48
119. Islam, M.F., Lin, K.H., Lacoste, D., Lubensky, T.C., and Yodh, A.G., Field-induced structures in miscible ferrofluid suspensions with and without latex spheres, *Physical Review E* **67**, 021402-1-8 (2003). DOI: 10.1103/PhysRevE.67.021402
120. Islam, M.F., Rojas, E., Bergey, D.M., Johnson, A.T., and Yodh, A.G., High weight fraction surfactant solubilization of single-wall carbon nanotubes in water, *Nano Letters* **3**, 269-273 (2003). DOI: 10.1021/nl025924u
121. Culver, J.P., Choe, R., Holboke, M.J., Zubkov, L., Durduran, T., Slemper, A., Ntziachristos, V., Pattanayak, D.N., Chance, B., and Yodh, A.G., Three-dimensional diffuse optical tomography in the plane parallel transmission geometry: Evaluation of a hybrid frequency domain/continuous wave clinical system for breast imaging, *Medical Physics* **30**, 235-247 (2003). DOI: 10.1118/1.1534109
122. Yodh, A.G., and Boas, D.A., Functional imaging with diffusing light, in *Biomedical Photonics Handbook*, Vo-Dinh, T., Ed., CRC Press: Boca Raton. p. 21-1-21-45, (2003).
123. Chen, D.T., Weeks, E.R., Crocker, J.C., Islam, M.F., Verma, R., Gruber, J., Levine, A.J., Lubensky, T.C., and Yodh, A.G., Rheological microscopy: local properties from microrheology, *Physical Review Letters* **90**, 108301-1-4 (2003). DOI: 10.1103/PhysRevLett.90.108301
124. Yu, G., Durduran, T., Furuya, D., Greenberg, J., and Yodh, A.G., Frequency domain multiplexing system for *in vivo* measurement of rapid cerebral hemodynamics, *Applied Optics-OT* **42**, 2931-2939 (2003). DOI: 10.1364/AO.42.002931
125. Cheung, R., Solonenko, M., Busch, T.M., Del Piero, F., Putt, M.P., Hahn, S.M., and Yodh, A.G., Correlation of *in-vivo* photosensitizer fluorescence and photodynamic-therapy-induced depth of necrosis in a murine tumor model, *Journal of Biomedical Optics* **8**, 248-252 (2003). DOI: 10.1117/1.1560011
126. Culver, J.P., Furuya, D., Durduran, T., Cheung, C., Greenberg, J.H., and Yodh, A.G., Diffuse optical tomography of cerebral blood flow, oxygenation, and metabolism in rat during focal ischemia. *Journal of Cerebral Blood Flow and Metabolism* **23**, 911-924 (2003). PMID: 12902835, DOI: 10.1097/01.wcb.0000076703.71231.bb

127. Friedberg, J.F., Skema, C., Burdick, J., Yodh, A.G., Carr, S.R., and Culver, J.P., A novel technique for light delivery through branched or bent anatomic structures. *Journal of Thoracic and Cardiovascular Surgery* **126**, 1963-1967 (2003). DOI: 10.1016/s0022-5223(03)01320-5
128. Yu, G., Durduran, T., Busch, T.M., Wang, H.-W., Zhou, C., Saunders, H.M., Sehgal, C.M., and Yodh, A.G., Non-invasive monitoring hemodynamic responses in RIF tumors during and after PDT, in *Proceedings of the SPIE, SPIE Photonics West 4952*, 131-139, San Jose, CA (2003). DOI: 10.1117/12.474101
129. Choe, R., Durduran, T., Yu, G., Nijland, M.J.M., Chance, B., Yodh A.G., and Ramanujam, N., Transabdominal near infrared oximetry of hypoxic stress in the fetal sheep brain *in utero*. *Proceedings of National Academy of Sciences USA* **100**, 12950-12954 (2003). PMID: 14563919, PMCID: PMC240725, DOI: 10.1073/pnas.1735462100
130. Corlu, A., Durduran, T., Choe, R., Schweiger, M., Hillman, E.M.C., Arridge, S.R., and Yodh, A.G., Uniqueness and wavelength optimization in continuous-wave multi-spectral diffuse optical tomography. *Optics Letters* **28**, 2339-2341 (2003). DOI: 10.1364/OL.28.002339
131. Menon, C., Polin, G.M., Prabakaran, I., Hsi, A., Cheung, C., Culver, J.P., Pingpank, J.F., Sehgal, C.S., Yodh, A.G., Buerk, D.G., and Fraker, D.L., An integrated approach to measuring tumor oxygen status using human melanoma xenografts as a model. *Cancer Research* **63**, 7232-7240 (2003). PMID: 14612518.
132. Intes, X., Ripoll, J., Chen, Y., Nioka, S., Yodh, A.G., and Chance, B., *In vivo* continuous-wave optical breast imaging enhanced with Indocyanine Green. *Medical Physics* **30**, 1039-1047 (2003). PMID: 12852527, DOI: 10.1118/1.1573791
133. Wang, H.-W., Zhu, T.C., Solonenko, M., Han, S.M., Metz, J.M., Dimofte, A., Miles, J., and Yodh, A.G., *In-vivo* measurements of penetration depth, oxygenation, and drug concentration using broadband absorption spectroscopy in human tissues before and after photodynamic therapy. *Proceedings of the SPIE - The International Society for Optical Engineering*, 4952, 68-75 (2003). DOI: 10.1117/12.474142
134. Zhou, W., Islam, M.F., Wang, H.-W., Ho, D.L., Yodh, A.G., Winey, K.I., and Fischer, J.E., Small angle neutron scattering from single-wall carbon nanotube suspensions: evidence of isolated rigid rods and rod networks. *Chemical Physics Letters* **384**, 185-189 (2004). DOI: 10.1016/j.cplett.2003.11.106
135. Fisher, J.A.N., Civillico, E.F., Contreras, D., and Yodh, A.G., *In vivo* fluorescence microscopy of neuronal activity in three dimensions by use of voltage-sensitive dyes, *Optics Letters* **29**, 71-73 (2004). DOI: 10.1364/OL.29.000071
136. Sapienza, R., Mujumdar, S., Cheung, C., Yodh, A.G., and Wiersma, D., Anisotropic weak localization of light. *Physical Review Letters* **92**, 033903-1-4 (2004).

DOI: 10.1103/PhysRevLett.92.033903

137. Islam, M.F., Alsayed, A.M., Dogic, Z., Zhang, J., Lubensky, T.C., and Yodh, A.G., Nematic nanotube gels. *Physical Review Letters* **92**, 088303-1-4 (2004). DOI: 10.1103/PhysRevLett.92.088303
138. Dogic, Z., Zhang, J., Lau, A.W.C., Aranda-Espinoza, H., Dalhaimer, P., Discher, D.E., Janmey, P.A., Kamien, R.D., Lubensky, T.C., and Yodh, A.G., Elongation and fluctuations of semi-flexible polymers in a nematic solvent. *Physical Review Letters* **92**, 125503-1-4 (2004). DOI: 10.1103/PhysRevLett.92.125503
139. Durduran, T., Burnett, M.G., Yu, G., Zhou, C., Furuya, D., Yodh, A.G., Detre, J.A., and Greenberg, J.H., Spatiotemporal quantification of cerebral blood flow during functional activation in rat somatosensory cortex using laser-speckle flowmetry. *Journal of Cerebral Blood Flow and Metabolism* **24**, 518-525 (2004). DOI: 10.1097/00004647-200405000-00005
140. Bednov, A., Ulyanov, S., Cheung, C., and Yodh, A.G., Correlation properties of multiple scattered light: implication to coherent diagnostics of burned skin. *Journal of Biomedical Optics* **9**, 347-352 (2004). DOI: 10.1117/1.16461711
141. Islam, M.F., Milkie, D.E., Kane, C.L., Yodh, A.G., and Kikkawa, J.M., Direct measurement of the polarized absorption cross section of single-wall carbon nanotubes. *Physical Review Letters* **93**, 037404-1-037404-4 (2004). DOI: 10.1103/PhysRevLett.93.037404
142. Durduran, T., Yu, G., Burnett, M.G., Detre, J.A., Greenberg, J.H., Wang, J., Zhou, C., and Yodh, A.G., Diffuse optical measurement of blood flow, blood oxygenation and metabolism in human brain during sensorimotor cortex activation. *Optics Letters* **29**, 1766-1768 (2004). PMID: 15352363, DOI: 10.1364/OL.29.001766
143. Alsayed, A.M., Dogic, Z., and Yodh, A.G., Melting of lamellar phases in temperature sensitive colloid-polymer suspensions. *Physical Review Letters* **93**, 057801-1-4 (2004). DOI: 10.1103/PhysRevLett.93.057801
144. Hough, L.A., Islam, M.F., Janmey, P.A., and Yodh, A.G., Viscoelasticity of single wall carbon nanotube suspensions. *Physical Review Letters* **93**, 168102-1-4 (2004). DOI: 10.1103/PhysRevLett.93.168102
145. Wang, H.-W., Putt, M.E., Emanuele, M.J., Shin, D.E., Glatstein, E., Yodh, A.G., and Busch, T.M., Treatment-induced changes in tumor oxygenation predict photodynamic therapy outcome. *Cancer Research* **64**, 7553-7561 (2004). PMID: 15492282, DOI: 10.1158/0008-5472.CAN-03-3632

146. Loudet, J.C., Alsayed, A.M., Zhang, J., and Yodh, A.G., Capillary interactions between anisotropic colloidal particles. *Physical Review Letters* **94**, 018301-1-4 (2005). DOI: 148301-1-148301-4
147. Wang, H.-W., Zhu, T.C., Putt, M., Solonenko, M., Metz, J., Dimofte, A., Mile, J., Fraker, D., Glatstein, E., Hahn, S.M., and Yodh, A.G., Broadband reflectance measurements of light penetration, blood oxygenation, hemoglobin concentration, and drug concentration in human intraperitoneal tissues before and after photodynamic therapy. *Journal of Biomedical Optics* **10**, 014004-1-014004-13 (2005). DOI: 10.1117/1.1854679
148. Bryning, M.B., Islam, M.F., Kikkawa, J.M., and Yodh, A.G., Very low conductivity threshold in bulk isotropic single-walled carbon nanotube-epoxy composites. *Advanced Materials* **17**, 1186-1191 (2005). DOI: 10.1002/adma.200401649
149. Yu, G., Durduran, T., Lech, G., Zhou, C., Chance, B., Mohler III, E.R., and Yodh, A.G., Time-dependent blood flow and oxygenation in human skeletal muscle measured with noninvasive near-infrared diffuse optical spectroscopies. *Journal of Biomedical Optics* **10**, 024027-1-024027-12 (2005). DOI: 10.1117/1.18846031
150. Yu, G., Durduran, T., Zhou, C., Wang, H.-W., Putt, M.E., Saunders, H.M., Sehgal, C.M., Glatstein, E., Yodh, A.G., and Busch, T.M., Noninvasive monitoring of murine tumor blood flow during and after photodynamic therapy provides early assessment of therapeutic efficacy. *Clinical Cancer Research* **11**, 3543-3552 (2005). PMID: 15867258, DOI: 10.1158/1078-0432.CCR-04-2582
151. Corlu, A., Choe, R., Durduran, T., Lee, K., Schweiger, M., Arridge, S.R., Hillman, E.M.C., and Yodh, A.G., Diffuse optical tomography with spectral constraints and wavelength optimization. *Applied Optics* **44**, 2082-2093 (2005). PMID:15835357, DOI: 10.1364/ao.44.002082
152. Choe, R., Corlu, A., Lee, K., Durduran, T., Konecky, S.D., Grosicka-Koptyra, M., Arridge, S.R., Czerniecki, B.J., Fraker, D.L., DeMichele, A., Chance, B., Rosen, M.A., and Yodh, A.G., Diffuse optical tomography of breast cancer during neoadjuvant chemotherapy: A case study with comparison to MRI. *Medical Physics* **32**, 1128-1139 (2005). PMID: 15895597, DOI:10.1118/1.1869612
153. Alsayed, A.M., Islam, M.F., Zhang, J., Collings, P.J., Yodh, A.G., Premelting at defects within bulk colloidal crystals. *Science* **309**, 1112399 (2005). DOI: 10.1126/science.1112399
154. Johnston, D.E., Islam, M.F., Yodh, A.G., and Johnson, A.T., Electronic devices based on purified carbon nanotubes grown by high-pressure decomposition of carbon monoxide. *Nature Materials* **4**, 589-592 (2005). DOI: 10.1038/nmat1427

155. Islam, M.F., Milkie, D.E., Torrens, O.N., Yodh, A.G., and Kikkawa, J.M., Magnetic heterogeneity and alignment of single wall carbon nanotubes. *Physical Review B* **71**, 201401-1-201401-4 (2005). DOI: 10.1103/PhysRevB.71.201401
156. Fisher, J.A.N., Salzberg, B.M., and Yodh, A.G., Near infrared two-photon excitation cross-sections of voltage-sensitive dyes. *Journal of Neuroscience Methods* **148**, 94-102 (2005). DOI:10.1016/j.jneumeth.2005.06.027
157. Bryning, M.B., Milkie, D.E., Islam, M.F., Kikkawa, J.M., and Yodh, A.G., Thermal conductivity and interfacial resistance in single wall carbon nanotube epoxy composites. *Applied Physics Letters* **87**, (2005). DOI: 10.1063/1.2103398
158. Islam, M.F., Nobili, M., Ye, F., Lubensky, T.C., and Yodh, A.G., Cracks and topological defects in lyotropic nematic gels. *Physical Review Letters* **95**, 148301-1-148301-4 (2005). DOI:10.1103/PhysRevLett.95.148301
159. Durduran, T., Choe, R., Yu, G., Zhou, C., Tchou, J.C., Czerniecki, B.J., and Yodh, A.G., Diffuse optical measurement of blood flow in breast tumors. *Optics Letters* **30**, 2915-2917 (2005). PMID: 16279468, DOI: 10.1364/OL.30.002915
160. Zhou, C., Yu, G., Furuya, D., Greenberg, J., Yodh, A., and Durduran, T., Diffuse optical correlation tomography of cerebral blood flow during cortical spreading depression in rat brain. *Optics Express* **14**, 1125-1144 (2006). PMID: 19503435, DOI: 10.1364/oe.14.001125
161. Hough, L.A., Islam, M.F., Hammouda, B., Yodh, A.G., and Heiney, P.A., Structure of semidilute single-wall carbon nanotube suspensions and gels. *Nano Letters* **6**, 313-317 (2006). DOI:10.1021/nl051871f
162. Fisher, J.A.N., Marchenko, V.A., Yodh, Arjun G., and Rogers, R.F., Spatiotemporal activity patterns during respiratory rhythmogenesis in the rat ventrolateral medulla. *Journal of Neurophysiology* **95**, 1982-1991 (2006). DOI: 10.1152/jn.00674.2005
163. Hahn, S.M., Fraker, D.L., Mick, R., Metz, J., Busch, T.M., Smith, D., Zhu, T., Rodriguez, C., Dimofte, A., Spitz, F., Putt, M., Rubin, S.C., Menon, C., Wang, H.-W., Shin, D., Yodh, A., and Glatstein, E., A phase II trial of intraperitoneal photodynamic therapy for patients with peritoneal carcinomatosis and sarcomatosis. *Clinical Cancer Research* **12**, 2517-2525 (2006). DOI: 10.1158/1078-0432.CCR-05-1625
164. Du, K.L., Mick, R., Busch, T., Zhu, T.C., Finlay, J.C., Yu, G., Yodh, A.G., Malkowicz, S.B., Smith, D., Whittington, R., Stripp, D., and Hahn, S.M., Preliminary results of interstitial motexafin lutetium-mediated PDT for prostate cancer. *Lasers in Surgery and Medicine* **38**, 427-434 (2006). DOI: 10.1002/lsm.20341

165. Loudet, J.C., Yodh, A.G., and Pouligny, B., Wetting and contact lines of micrometer-sized ellipsoids. *Physical Review Letters* **97**, 018304-1-018304-4 (2006). DOI:10.1103/PhysRevLett.97.018304
166. Dahl, K.N., Scaffidi, P., Islam, M.F., Yodh, A.G., Wilson, K.L., and Misteli, T., Distinct structural and mechanical properties of the nuclear lamina in Hutchinson-Gilford progeria syndrome. *Proceedings of the National Academy of Sciences USA* **103**, 10271-10276 (2006). DOI:10.1073/pnas.0601058103
167. Yu, G., Durduran, T., Zhou, C., Zhu, T.C., Finlay, J.C., Busch, T.M., Malkowicz, S.B., Hahn, S.M., and Yodh, A.G., Real-time in situ monitoring of human prostate photodynamic therapy with diffuse light. *Photochemistry and Photobiology* **82**, 1279-1284 (2006). DOI:10.1562/2005-10-19-ra-721
168. Ross, H.M., Smelstoys, J.A., Davis, G.J., Kapatkin, A.S., Del Piero, F., Reineke, E., Wang, H., Zhu, T.C., Busch, T.M., Yodh, A.G., and Hahn, S.M., Photodynamic therapy with motexafin lutetium for rectal cancer: A preclinical model in the dog. *Journal of Surgical Research* **135**, 323-330 (2006). DOI: 10.1016/j.jss.2006.01.020
169. Han, Y., Alsayed, A.M., Nobili, M., Zhang, J., Lubensky, T.C., and Yodh, A.G., Brownian motion of an ellipsoid. *Science* **314**, 626-630 (2006). DOI: 10.1126/science.1130146
170. Sunar, U., Quon, H., Durduran, T., Zhang, J., Du, J., Zhou, C., Yu, G., Choe, R., Kilger, A., Lustig, R., Loevner, L., Nioka, S., Chance, B., and Yodh, A.G., Noninvasive diffuse optical measurement of blood flow and blood oxygenation for monitoring radiation therapy in patients with head and neck tumors: a pilot study. *Journal of Biomedical Optics* **11**, 064021-1-064021-13 (2006). PMID: 17212544, DOI: 10.1117/1.2397548
171. Yu, G.Q., Floyd, T.F., Durduran, T., Zhou, C., Wang, J., Detre, J.A., and Yodh, A.G., Validation of diffuse correlation spectroscopy for muscle blood flow with concurrent arterial spin labeled perfusion MRI. *Optics Express* **15**, 1064-1075 (2007). PMID: 19532334, DOI:10.1364/oe.15.001064
172. Bryning, M.B., Milkie, D.E., Islam, M.F., Hough, L.A., Kikkawa, J.M., and Yodh, A.G., Carbon nanotube aerogels. *Advanced Materials* **19**, 661-664 (2007). DOI: 10.1002/adma.200601748
173. Wang, H.W., Finlay, J.C., Lee, K., Zhu, T.C., Putt, M.E., Glatstein, E., Koch, C.J., Evans, S.M., Hahn, S.M., Busch, T.M., and Yodh, A.G., Quantitative comparison of tissue oxygen and motexafin lutetium uptake by ex vivo and noninvasive in vivo techniques in patients with intraperitoneal carcinomatosis. *Journal of Biomedical Optics* **12**, 034023 (2007). DOI:10.1117/1.2743082

174. Corlu, A., Choe, R., Durduran, T., Rosen, M.A., Schweiger, M., Arridge, S.R., Schnall, M.D., and Yodh, A.G., Three-dimensional in vivo fluorescence diffuse optical tomography of breast cancer in humans. *Optics Express* **15**, 6696-6716 (2007). PMID: 19546980, DOI: 10.1364/oe.15.006696
175. Chen, D.T.N., Lau, A.W.C., Hough, L.A., Islam, M.F., Goulian, M., Lubensky, T.C., and Yodh, A.G., Fluctuations and rheology in active bacterial suspensions. *Physical Review Letters* **99**, 148302-1-4 (2007). DOI: 10.1103/PhysRevLett.99.148302
176. Zhou, C., Choe, R., Shah, N., Durduran, T., Yu, G., Durkin, A. Hsiang, D., Mehta, R., Butler, J., Cerussi, A., Tromberg, B.J., and Yodh, A.G. Diffuse optical monitoring of blood flow and oxygenation in human breast cancer during early stages of neoadjuvant chemotherapy. *Journal of Biomedical Optics*, **12**, 051903 (2007). PMID: 17994886, DOI: 10.1117/1.2798595
177. Azar, F.S., Lee, K., Khamene, A., Choe, R., Corlu, A., Konecky, S.D., Sauer, F., and Yodh, A.G. Standardized platform for coregistration of nonconcurrent diffuse optical and magnetic resonance breast images obtained in different geometries. *Journal of Biomedical Optics* **12**, 051902-1-14 (2007). PMID: 179948,5 DOI: 10.1117/1.2798630
178. Wang, H.W., Rickter, E., Yuan, M., Wileyto, E.P., Glatstein, E., Yodh, A.G., and Busch, T.M. Effect of photosensitizer doser on fluence rate responses to photodynamic therapy. *Photochemistry and Photobiology* **83**, 1040-1048 (2007). DOI: 10.1111/j.1751-1097.2007.00139.x
179. Sunar, U., Makonnen, S., Zhou, C., Durduran, T., Yu, G., Wang, H-W., Lee, W.M., and Yodh, A.G., Hemodynamic responses to antivasular therapy and ionizing radiation assessed by diffuse optical spectroscopies. *Optics Express* **15**, 15507-15516 (2007). PMID: 19550836 DOI:10.1364/OE.15.015507
180. Wen, Q., Basu, A., Winer, J.P., Yodh, A.G., and Janmey, P.A., Local and global deformations in a strain-stiffening fibrin gel. *New Journal of Physics* **9**, 428-1-428-10 (2007). DOI: 10.1088/1367-2630/9/11/428
181. Song, L., Li, H., Sunar, U., Chen, J., Corbin, I., Yodh, A.G., and Zheng, G., Naphthalocyanine-reconstituted LDL nanoparticles for in vivo cancer imaging and treatment. *International Journal of Nanomedicine* **2**, 767-774 (2007). PMID: 18203443; PMCID: PMC2676824.
182. Konecky, S.D., Choe, R., Corlu, A., Lee, K., Wiener, R., Srinivas, S.M., Saffer, J.R., Freifelder, R., Karp, J.S., Jajjioui, N., Azar, F., and Yodh, A.G., Comparison of diffuse optical tomography of human breast with whole-body and breast-only positron emission tomography. *Medical Physics* **35**, 446-455 (2008). PMID: 18383664; PMCID: PMC2471877, DOI: 10.1118/1.2826560

183. Han, Y., Ha, N.Y., Alsayed, A.M., and Yodh, A.G., Melting of two-dimensional tunable-diameter colloidal crystals. *Physical Review E* **77**, 041406-1-041406-7 (2008). DOI: 10.1103/PhysRevE.77.041406
184. Fisher J.A.N., Barchi, J.R., Welle, C.G., Kim, G-H., Kosterin, P., Obaid, A.L., Yodh, A.G., Contreras, D., and Salzberg, B.M., Two-photon excitation of potentiometric probes enables optical recording of action potentials from mammalian nerve terminals in situ. *Journal of Neurophysiology* **99**, 1545-1553 (2008). DOI: 10.1152/jn.00929.2007
185. Konecky, S.D., Panasyuk, G.Y., Lee, K., Markel, V., Yodh, A.G., and Schotland J.C., Imaging complex structures with diffuse light. *Optics Express* **16**, 5048-5060 (2008). PMID: PMC2471872, DOI: 10.1364/OE.16.005048
186. Zhou, C., Shimazu, T., Durduran, T., Luckl, J., Kimberg, D.Y., Yu, G., Chen, X-H., Detre, J.A., Yodh, A.G., and Greenberg, J.H., Acute functional recovery of cerebral blood flow after forebrain ischemia in rat. *Journal of Cerebral Blood Flow & Metabolism*, **28**, 1275-1284 (2008). PMID: PMC2771551, DOI: 10.1038/jcbfm.2008.21
187. Perini, R., Choe, R., Yodh, A.G., Sehgal, C., Divgi, C.R., and Rosen, M.A., Non-invasive assessment of tumor neovasculature: techniques and clinical applications. *Cancer Metastasis Review* **27**, 615-630 (2008). PMID:18506398, DOI: 10.1007/s10555-008-9147-6
188. Tromberg, B.J., Pogue, B.W., Paulsen, K.D., Yodh, A.G., Boas, D.A., and Cerussi, A.E., Assessing the future of diffuse optical imaging technologies for breast cancer management. *Medical Physics* **35**, 2443-2451 (2008). PMID: PMC2809725. DOI:10.1118/1.2919078
189. Konecky, S.D., and Yodh, A.G., Diffuse optical imaging and PET imaging, in *Translational Multimodality Optical Imaging*, Azar, F.S., and Intes, X., eds., Artech House: Boston, p. 205-224 (2008).
190. Choe, R., and Yodh, A.G., Diffuse optical tomography of the breast, in *Emerging Technologies in Breast Imaging and Mammography*, Suri, J.S., Rangayyan, R.M., and Laxminarayan, S., eds., American Scientific Publishers: Stevenson Ranch, CA, p. 317-342 (2008).
191. Han, Y., Shokef, Y., Alsayed, A.M., Yunker, P., Lubensky, T.C., and Yodh, A.G., Geometric frustration in buckled colloidal monolayers. *Nature* **456**, 898-903 (2008). DOI:10.1038/nature07595
192. Durduran, T., Zhou, C., Edlow, B.L., Yu, G., Choe, R., Kim, M.N., Cucchiara, B.L., Putt, M.E., Shah, Q., Kasner, S.E., Greenberg, J.H., Yodh, A.G., and Detre, J.A., Transcranial optical monitoring of cerebrovascular hemodynamics in acute stroke patients. *Optics Express* **17**, 3884-3902 (2009). PMID: PMC2724658 DOI: 10.1364/OE.17.003884

193. Luckl, J., Zhou, C., Durduran, T., Yodh, A.G., and Greenberg, J.H., Characterization of periinfarct flow transients with laser speckle and Doppler after middle cerebral artery occlusion in the rat. *Journal of Neuroscience Research* **87**, 1219-1229 (2009). NIHMSID #87134, DOI:10.1002/jnr.21933
194. Choe, R., Konecky, S.D., Corlu, A., Lee, K., Durduran, T., Busch, D.R., Pathak, S., Czerniecki, B.J., Tchou, J., Fraker, D.L., DeMichele, A., Chance, B., Arridge, S.R., Schweiger, M., Culver, J.P., Schnall, M.D., Putt, M.E., Rosen, M.A., and Yodh, A.G., Differentiation of benign and malignant breast tumors by in-vivo three-dimensional parallel-plate diffuse optical tomography. *Journal of Biomedical Optics* **14**, 024020 (2009). PMID: 19405750; PMCID: PMC2782703, DOI: 10.1117/1.3103325
195. Fisher, J.A.N., Susumu, K., Therien, M.J., and Yodh, A.G., One- and two-photon absorption of highly conjugated multiporphyrin systems in the two-photon soret transition region. *Journal of Chemical Physics* **130**, 134506 (2009). PMCID: PMC2719470 DOI: 10.1063/1.3089795
196. Zhang, Z., Xu, N., Chen, D.T.N., Yunker, P., Alsayed, A., Aptowicz, K.B., Habdas, P., Liu, A.J., Nagel, S., and Yodh, A.G., Thermal vestige of the zero-temperature jamming transition. *Nature* **459**, 230-233 (2009). DOI: 10.1038/nature07998
197. Han, Y.L., Alsayed, A., Nobili, M., and Yodh, A.G., Quasi-two-dimensional diffusion of single ellipsoids: Aspect ratio and confinement effects. *Physical Review E* **80**, 011403-1-011403-6 (2009). PMID:19658705, DOI: 10.1103/PhysRevE.80.011403
198. Buckley, E.M., Cook, N.M., Durduran, T., Kim, M.N., Zhou, C., Choe, R., Yu, G., Shultz, S., Sehgal, C.M., Licht, D.J., Arger, P.H., Putt, M.E., Hurt, H., and Yodh, A.G., Cerebral hemodynamics in preterm infants during positional intervention measured with diffuse correlation spectroscopy and transcranial Doppler ultrasound. *Optics Express* **17**, 12571-12581 (2009). PMID: 19654660; PMCID: PMC2723781, DOI: 10.1364/OE.17.012571
199. Zhou, C., Eucker, S.A., Durduran, T., Yu, G., Ralston, J., Friess, S.H., Ichord, R.N., Margulies, S.S., and Yodh, A.G., Diffuse optical monitoring of hemodynamic changes in piglet brain with closed head injury. *Journal of Biomedical Optics* **14**, 034015-1-034015-11 (2009). PMCID: PMC3169814, DOI: 10.1117/1.3146814
200. Latka, A., Han, Y., Alsayed, A.M., Schofield, A.B., Yodh, A.G., and Habdas, P., Particle dynamics in colloidal suspensions above and below the glass-liquid re-entrance transition. *Europhysics Letters* **86**, 58001-1-58001-5 (2009). DOI: 10.1209/0295-5075/86/58001
201. Yunker, P., Zhang, Z.X., Aptowicz, K.B., and Yodh, A.G., Irreversible rearrangements, correlated domains, and local structure in aging glasses. *Physical Review Letters* **103**, 115701-1-115701-4 (2009). PMID:19792383, DOI: 10.1103/PhysRevLett.103.115701
202. Busch, T.M., Xing, X., Yu, G., Yodh, A., Wileyto, E.P., Wang, H.W., Durduran, T., Zhu, T.C., and Wang, K.K.H., Fluence rate-dependent intratumor heterogeneity in physiologic

- and cytotoxic responses to Photofrin photodynamic therapy. *Photochemical & Photobiological Sciences* **8**, 1683-1693 (2009). DOI: 10.1039/b9pp00004f
203. Cerniglia, G.J., Pore, N., Tsai, J.H., Schultz, S., Mick, R. Choe, R., Xing, X., Durduran, T., Yodh, A.G., Evans, S.M., Koch, C.J., Hahn, S.M., Quon, H., Sehgal, C.M., Lee, W.M.F., and Maity, A., Epidermal Growth Factor Receptor Inhibition Modulates the Microenvironment by Vascular Normalization to Improve Chemotherapy and Radiotherapy Efficacy. *PLOS ONE* **4**, e6539 (2009). PMID: PMC2716529, DOI: 10.1371/journal.pone.0006539
 204. Yunker, P., Zhang, Z.X., and Yodh, A.G., Observation of the disorder-induced crystal-to-glass transition. *Physical Review Letters* **104**, 015701 (2010). PMID:20366370, DOI: 10.1103/PhysRevLett.104.015701
 205. Chen, D.T.N., Chen, K., Hough, L.A., Islam, M.F., and Yodh, A.G., Rheology of carbon nanotube networks during gelation. *Macromolecules* **43**, 2048-2053 (2010). DOI: 10.1021/ma902230a
 206. Edlow, B.L., Kim, M.N., Durduran, T., Zhou, C., Putt, M.E., Yodh, A.G., Greenberg, J.H., and Detre, J.A., The effects of healthy aging on cerebral hemodynamic responses to posture change. *Physiological Measurement* **31**, 477-495 (2010). PMID: 20181999, DOI: 10.1088/0967-3334/31/4/002
 207. Lohr, M.A., Alsayed, A.M., Chen, B.G., Zhang, Z., Kamien, R.D., and Yodh, A.G., Helical packings and phase transformations of soft spheres in cylinders. *Physical Review E* **81**, 040401(Rapid Communications) (2010). DOI: 10.1103/PhysRevE.81.040401
 208. Wang, Z., Alsayed, A.M., Yodh, A.G., and Han, Y., Two-dimensional freezing criteria for crystallizing colloidal monolayers. *Journal of Chemical Physics* **132**, 154501 (2010). PMID:20423183, DOI: 10.1063/1.3372618
 209. Busch, D.R., Guo, W.S., Choe, R., Durduran, T., Feldman, M.D., Mies, C., Rosen, M.A., Schnall, M.D., Czerniecki, B.J., Tchou, J., DeMichele, A., Putt, M.E., and Yodh, A.G., Computer aided automatic detection of malignant lesions in diffuse optical mammography. *Medical Physics* **37**, 1840-1849 (2010). PMID: 20443506, PMID: PMC2864673, DOI: 10.1118/1.3314075
 210. Kim, M.N., Durduran, T., Frangos, S., Edlow, B.L., Buckley, E.M., Moss, H.E., Zhou, C., Yu, G.Q., Choe, R., Maloney-Wilensky, E., Wolf, R.L., Grady, M.S., Greenberg, J.H., Levine, J.M., Yodh, A.G., Detre, J.A., and Kofke, W.A., Noninvasive measurement of cerebral blood flow and blood oxygenation using near-infrared and diffuse correlation spectroscopies in critically brain-injured adults. *Neurocritical Care* **12**, 173-180 (2010). PMID: 19908166, PMID: PMC2844468, DOI: 10.1007/s12028-009-9305-x
 211. Durduran, T., Zhou, C., Buckley, E.M., Kim, M.N., Yu, G., Choe, R., Gaynor, J.W., Spray, T.L., Durning, S.M., Mason, S.E., Montenegro, L.M., Nicolson, S.C., Zimmerman,

- R.A., Putt, M.E., Wang, J., Greenberg, J.H., Detre, J.A., Yodh, A.G., and Licht, D.J., Optical measurement of cerebral hemodynamics and oxygen metabolism in neonates with congenital heart defects. *Journal of Biomedical Optics* **15**, 037004 (2010). PMID: 20615033, PMCID: PMC2887915, DOI: 10.1117/1.3425884
212. Peng, Y., Wang, Z., Alsayed, A.M., Yodh, A.G., and Han, Y., Melting of colloidal crystal films. *Physical Review Letters* **104**, 205703 (2010). DOI:10.1103/PhysRevLett.104.205703
213. Durduran, T., Choe, R., Baker, W.B, and Yodh, A.G., Diffuse optics for tissue monitoring and tomography. *Reports on Progress in Physics* **73**, 076701 (2010). DOI: 10.1088/0034-4885/73/7/076701
214. Chen, D.T.N., Wen, Q., Janmey, P.A., Crocker, J.C., and Yodh, A.G., Rheology of soft materials. *Annual Review of Condensed Matter Physics* **1**, 301-322 (2010). DOI: 10.1146/annurev-conmatphys-070909-104120
215. Shang, Y., Symons, T.B., Durduran, T., Yodh, A.G., and Yu, G., Effects of muscle fiber motion on diffuse correlation spectroscopy blood flow measurements during exercise. *Biomedical Optics Express* **1**, 500-511 (2010). PMID: 21258485; PMCID: PMC3018004, DOI: 10.1364/boe.1.001173
216. Chen, K., Ellenbroek, W.G., Zhang, Z.X., Chen, D.T.N., Yunker, P.J., Henkes, S., Brito, C., Dauchot, O., van Saarloos, W., Liu, A.J., and Yodh, A.G., Low-frequency vibrations of soft colloidal glasses. *Physical Review Letters* **105**, 025501-1-025501-4 (2010). PMID:20867714, DOI: 10.1103/PhysRevLett.105.025501
217. Luckl, J., Baker, W., Sun, Z-H., Durduran, T., Yodh, A.G., and Greenberg, J.H., The biological effect of contralateral forepaw stimulation in rat focal cerebral ischemia: a multispectral optical imaging study. *Frontiers in Neuroenergetics* **2**, 1-9 (2010). PMID: 20725601, PMCID: PMC2922941, DOI: 10.3389/fnene.2010.00019
218. Nordstrom, K.N., Verneuil, E., Arratia1, P.E., Basu, A., Zhang, Z., Yodh, A.G., Gollub, J.P., and Durian, D.J., Microfluidic rheology of soft colloids above and below jamming. *Physical Review Letters* **105**, 175701 (2010). DOI: 10.1103/PhysRevLett.105.175701
219. Mesquita, R.C., Skuli, N., Kim, M.N., Liang, J., Schenkel, S., Majmundar, A.J., Simon, M.C., and Yodh, A.G., Hemodynamic and metabolic diffuse optical monitoring in a mouse model of hindlimb ischemia. *Biomedical Optics Express* **1**, 1173-1187 (2010). PMID: 21258539, PMCID: PMC3018079, DOI: 10.1364/boe.1.001173
220. Ye, X.C., Collins, J.E., Kang, Y.J., Chen, J., Chen, D.T.N., Yodh, A.G., and Murray, C.B., Morphologically controlled synthesis of colloidal upconversion nanophosphors and their shape-directed self-assembly. *Proceedings of the National Academy of Sciences USA* **107**, 22430-22435 (2010). PMCID: PMC3012508, DOI: 10.1073/pnas.1008958107

221. Peng, Y., Wang, Z.-R., Alsayed, A.M., Yodh, A.G., and Han, Y., Melting of multilayer colloidal crystals confined between two walls. *Physical Review E* **83**, 011404 (2011). PMID:21405695, DOI: 10.1103/PhysRevE.83.011404
222. Yunker, P.J., Chen, K., Zhang, Z.X., Ellenbroek, W.G., Liu, A.J., and Yodh, A.G., Rotational and translational phonon modes in glasses composed of ellipsoidal particles. *Physical Review E* **83**, 011403, (2011). PMID:21405694, DOI: 10.1103/PhysRevE.83.011403
223. Basu, A., Wen, Q., Mao, X., Lubensky, T.C., Janmey, P.A., and Yodh, A.G., Nonaffine displacements in flexible polymer networks. *Macromolecules* **44**, 1671-1679 (2011). DOI:10.1021/ma1026803
224. Alsayed, A.M., Han, Y., and Yodh, A.G., Melting and geometric frustration in temperature-sensitive colloids, in *Microgel Suspensions*, Fernandez-Nieves, A., Wyss, H.M., Mattsson, J., and Weitz, D.A., eds., Wiley-VCH: Weinheim, Germany pp. 229-281 (2011).
225. Yunker, P.J., Chen, K., Zhang, Z., and Yodh, A.G., Phonon spectra, nearest neighbors, and mechanical stability of disordered colloidal clusters with attractive interactions. *Physical Review Letters* **106**, 225503, (2011). PMID:21702614, DOI: 10.1103/PhysRevLett.106.225503
226. Susumu, K., Fisher, J.A.N., Zheng, J.R., Beratan, D.N., Yodh, A.G., Therien, M.J., Two-photon absorption properties of proquinoidal D-A-D and A-D-A quadrupolar chromophores. *Journal of Physical Chemistry A* **115**, 5525-5539, (2011). PMCID: PMC3121192, DOI: 10.1021/jp2000738
227. Yu, G., Durduran, T., Zhou, C., Cheng, R., and Yodh, A.G., Near-infrared diffuse correlation spectroscopy for assessment of tissue blood flow, in *Handbook of Biomedical Optics*, Boas, D.A., Pitris, C., and Ramanujam, N., eds., CRC Press: Boca Raton. pp. 195-216 (2011).
228. Mesquita, R.C. and Yodh, A.G., Diffuse optics: Fundamentals and tissue applications, in *Proceedings of the International School of Physics "Enrico Fermi" Course CLXXIII "Nano Optics and Atomics: Transport of Light and Matter Waves,"* Kaiser, R., Weirsmas, D.S., and Fallini, L., eds., IOS Press: Amsterdam. pp. 51-74 (2011).
229. Yunker, P.J., Still, T., Lohr, M.A., and Yodh, A.G., Suppression of the coffee-ring effect by shape-dependent capillary interactions. *Nature* **476**, 308-311, (2011). PMID:21850105, DOI:10.1038/nature10344
230. Chen, K., Manning, M.L., Yunker, P.J., Ellenbroek, W.G., Zhang, Z., Liu, A.J., and Yodh, A.G., Measurement of correlations between low-frequency vibrational modes and particle rearrangements in quasi-two-dimensional colloidal glasses. *Physical Review Letters* **107**, 108301, (2011). PMID:21981536, DOI: 10.1103/PhysRevLett.107.108301

231. Mesquita, R.C., Durduran, T., Yu, G., Buckley, E.M., Kim, M.N., Zhou, C., Choe, R., Sunar, U., Yodh, A.G., Direct measurement of tissue blood flow and metabolism with diffuse optics. *Philosophical Transactions of the Royal Society A* **369**, 4358-4379, (2011). PMID: 22006897, PMCID: PMC3263785, DOI: 10.1098/rsta.2011.0232
232. Chung, S.H., Mehta, R., Tromberg, B.J., and Yodh, A.G., Non-invasive measurement of deep tissue temperature changes caused by apoptosis during breast cancer neoadjuvant chemotherapy: A case study. *Journal of Innovative Optical Health Sciences* **4**, 361-372, (2011). PMID: 22408653, PMCID: PMC3296557, DOI: 10.1142/s1793545811001708
233. Elwell, C.E., Boas, D.A., Cooper, C.E., Delpy, D., Ferrari, M., Quaresima, V., and Yodh, A.G., Britton Chance 1913-2010 Dedication. *Philosophical Transactions of the Royal Society A – Mathematical Physical and Engineering Sciences* **369**, 4380-4389 2011. DOI:10.1098/rsta.2011.0313
234. Zhang, Z., Yunker, P.J., Habdas, P., and Yodh, A.G., Cooperative rearrangement regions and dynamical heterogeneities in colloidal glasses with attractive versus repulsive interactions. *Physical Review Letters* **107**, 208303-1-208303-5, (2011). PMID:22181781, DOI:10.1063/1.3372618
235. Tellis, G.M., Mesquita, R.C., and Yodh, A.G., Use of diffuse correlation spectroscopy to measure brain blood flow differences during speaking and nonspeaking tasks for fluent speakers and persons who stutter, *Perspectives on Fluency and Fluency Disorders* **21**, 96-106 (2011). DOI:10.1044/ffd21.3.96
236. Still, T., Yunker, P.J., and Yodh, A.G., Surfactant-induced marangoni eddies alter the coffee-rings of evaporating colloidal drops. *Langmuir* **28**, 4984-4988 (2012). PMID:22369657, DOI:10.1021/la204928m
237. Majmundar, A.J., Skuli, N., Mesquita, R.C., Kim, M.N., Yodh, A.G., Nguyen-McCarty, M., and Simon, M.C., O₂ Regulates skeletal muscle progenitor differentiation through phosphatidylinositol 3-Kinase/AKT signaling. *Molecular and Cellular Biology* **32**, 36-49 (2012). PMID: 22006022, PMCID: PMC3255700, DOI: 10.1128/mcb.05857-11
238. Mesquita, R.C., Han, S.W., Miller, J., Schenkel, S.S., Pole, A., Esipova, T.V., Vinogradov, S.A., Putt, M.E., Yodh, A.G., and Busch, T.M., Tumor blood flow differs between mouse strains: consequences for vasoresponse to photodynamic therapy. *PLOS ONE* **7**, e37322 (2012). PMID: 22624014, PMCID: PMC3356280, DOI: 10.1371/journal.pone.0037322
239. Skuli, N., Majmundar, A.J., Krock, B.L., Mesquita, R.C., Mathew, L.K., Quinn, Z.L., Runge, A. Liu, L.P., Kim, M.N., Liang, J.M., Schenkel, S., Yodh, A.G., Keith, B., and Simon, M.C., Endothelial HIF-2 α regulates murine pathological angiogenesis and revascularization processes. *Journal of Clinical Investigation* **122**, 1427-1443 (2012).

PMID: 22426208; PMCID: PMC3314446, DOI: 10.1172/JCI57322; (Corrigendum), *Journal of Clinical Investigation* **134**, p.e180863, DOI: 10.1172/JCI180863 (2024).

240. Yunker, P.J., Gratale, M., Lohr, M.A., Still, T., Lubensky, T.C., and Yodh, A.G., Influence of particle shape on bending rigidity of colloidal monolayer membranes and particle deposition during droplet evaporation in confined geometries. *Physical Review Letters* **108**, 228303 (2012). PMID:23003662, DOI: 10.1103/PhysRevLett.108.228303
241. Buckley, E.M., Hance, D., Pawlowski, T., Lynch, J., Wilson, F.B., Mesquita, R.C., Durduran, T., Diaz, L.K., Putt, M.E., Licht, D.J., Fogel, M.A., and Yodh, A.G., Validation of diffuse correlation spectroscopic measurement of cerebral blood flow using phase-encoded velocity mapping magnetic resonance imaging. *Journal of Biomedical Optics* **17**, 037007 (2012). PMID: 22502579; PMCID: PMC3380925, DOI: 10.1117/1.JBO.17.3.037007
242. Wen, Q., Basu, A., Janmey, P.A., and Yodh, A.G., Non-affine deformations in polymer hydrogels. *Soft Matter* **8**, 8039-8049 (2012). PMCID: PMC3445422
DOI: 10.1039/c2sm25364j
243. Baker, W.B., Sun, Z.H., Hiraki, T., Putt, M.E., Durduran, T., Reivich, M., Yodh, A.G., and Greenberg, J.H., Neurovascular coupling varies with level of global cerebral ischemia in a rat model. *Journal of Cerebral Blood Flow and Metabolism* **33**, 97-105 (2013). PMID: 23032485; PMCID: PMC3597370, DOI: 10.1038/jcbfm.2012.137
244. Busch, D.R., Choe, R., Rosen, M.A., Guo, W., Durduran, T., Feldman, M.D., Mies, C., Czerniecki, B.J., Tchou, J., DeMichele, A., Schnall, M.D., and Yodh, A.G., Optical malignancy parameters for monitoring progression of breast cancer neoadjuvant chemotherapy. *Biomedical Optics Express* **4**, 105-121 (2013). PMID: 23304651; PMCID: PMC3539198, DOI:10.1364/BOE.4.000105
245. Buckley, E.M., Lynch, J.M., Goff, D.A., Schwab, P.J., Baker, W.B., Durduran, T., Busch, D.R., Nicolson, S.C., Montenegro, L.M., Naim, M.Y., Xiao, R., Spray, T.L., Yodh, A.G., Gaynor, J.W., and Licht, D.J., Early postoperative changes in cerebral oxygen metabolism following neonatal cardiac surgery: Effects of surgical duration. *Journal of Thoracic and Cardiovascular Surgery* **145**, 196–205 (2013). PMID: 23111021; PMCID: PMC365810, DOI:10.1016/j.jtcvs.2012.09.057
246. Yunker, P.J., Lohr, M.A., Still, T., Borodin, A., Durian, D.J., and Yodh, A.G., Effects of particle shape on growth dynamics at edges of evaporating drops of colloidal suspensions, *Physical Review Letters* **110**, 035501 (2013). PMID:23373933, DOI:10.1103/PhysRevLett.110.035501
247. Ban, H.Y., Busch, D.R., Pathak, S., Moscatelli, F.A., Machida, M., Schotland, J.C., Markel, V.A., and Yodh, A.G., Diffuse optical tomography in the presence of a chest wall. *Journal of Biomedical Optics* **18**, 026016 (2013). PMID: 23392384; PMCID: PMC3566530, DOI: 10.1117/1.JBO.18.2.026016

248. Ould-Moussa, N., Blanc, C., Zamora-Ledezma, C., Lavrentovich, O.D., Smalyukh, I.I., Islam, M.F., Yodh, A.G., Maugey, M., Poulin, P., Anglaret, E., and Nobili, M., Dispersion and orientation of single-walled carbon nanotubes in a chromonic liquid crystal. *Liquid Crystals* **40**, 1628-1635 (2013). DOI:10.1080/02678292.2013.772254
249. Buckley, E.M., Naim, M.Y., Lynch, J.M., Goff, D.A., Schwab, P.J., Diaz, L.K., Nicolson, S.C., Montenegro, L.M., Lavin, N.A., Durduran, T., Spray, T.L., Gaynor, J.W., Putt, M.E., Yodh, A.G., Fogel, M.A., and Licht, D.J., Sodium bicarbonate causes dose-dependent increases in cerebral blood flow in infants and children with single-ventricle physiology. *Pediatric Research* **73**, 668-673 (2013). PMID: 23403802, PMCID: PMC3724528, DOI:10.1038/pr.2013
250. Gratale, M.D., Yunker, P.J., Chen, K., Still, T., Aptowicz, K.B., and Yodh, A.G., Phonons in two-dimensional colloidal crystals with bond-strength disorder. *Physical Review E* **87**, 052301 (2013). PMID:23767534, DOI: 10.1103/PhysRevE.87.052301
251. Shokef, Y., Han, Y., Souslov, A., Yodh, A.G. and Lubensky, T.C., Buckled colloidal monolayers connect geometric frustration in soft and hard matter. *Soft Matter* **9**, 6565-6570 (2013). DOI:10.1039/c3sm00069a
252. Yunker, P.J., Zhang, Z.X., Gratale, M., Chen, K. and Yodh, A.G., Relationship between neighbor number and vibrational spectra in disordered colloidal clusters with attractive interactions. *Journal of Chemical Physics* **138**, 12A525 (2013). PMID:23556776, DOI:10.1063/1.4774076
253. Mesquita, R.C., Putt, M., Chandra, M., Yu, G., Xing, X., Han, S.W., Lech, G., Shang, Y., Durduran, T., Zhou, C., Yodh, A.G., and Mohler, E.R., Diffuse optical characterization of an exercising patient group with peripheral artery disease. *Journal of Biomedical Optics* **18**, 057007 (2013). PMID: 23708193; PMCID: PMC3662991, DOI: 10.1117/1.JBO.18.5.057007
254. Yunker, P.J., Yodh, A.G., and Still, T., Colloidal shape effects in evaporating drops. *Proceedings of the International School of Physics "Enrico Fermi" Course CLXXXIV "Physics of Complex Colloids"*, eds., Bechinger, C., Sciortino, F., and Zihlerl, P. (IOS, Amsterdam; SIF, Bologna), pp. 447-481 (2013). DOI 10.3254/978-1-61499-278-3-447
255. Still, T., Chen, K. Alsayed, A.M., Aptowicz, K.B., and Yodh, A.G., Synthesis of micrometer-size poly(N-isopropylacrylamide) microgel particles with homogeneous crosslinker density and diameter control. *Journal of Colloid and Interface Sciences* **405**, 96-102 (2013). PMID:23773610, DOI: 10.1016/j.jcis.2013.05.042
256. Busch, D. R., Choe, R., Durduran, T., and Yodh, A. G., Towards noninvasive characterization of breast cancer and cancer metabolism with diffuse optics. *PET Clinics*, **8**, 345-365 (2013). PMID: 24244206; PMCID: PMC3826963, DOI: 10.1016/j.cpet.2013.04.004

257. Mesquita, R.C., Faseyitan, O.K., Turkeltaub, P.E., Buckley, E.M., Thomas, A., Kim, M.N., Durduran, T., Greenberg, J.H., Detre, J.A., Yodh, A.G., and Hamilton, R.H., Blood flow and oxygenation changes due to low-frequency repetitive transcranial magnetic stimulation of the cerebral cortex. *Journal of Biomedical Optics* **18**, 067006 (2013). 067006 PMID: 23757042; PMCID: PMC3678989, DOI: 10.1117/1.JBO.18.6
258. Mesquita, R.C., Schenkel, S.S., Minkoff, D.L., Lu, X.P., Favilla, C.G., Vora, P.M., Busch, D.R., Chandra, M., Greenberg, J.H., Detre, J.A., and Yodh, A.G., Influence of probe pressure on the diffuse correlation spectroscopy blood flow signal: extra-cerebral contributions. *Biomedical Optics Express* **4**, 978-994 (2013). PMID: 23847725, PMCID: PMC3704102, DOI:10.1364/BOE.4.000978
259. Yunker, P.J., Durian, D.J., and Yodh, A.G., Coffee rings and coffee disks: Physics on the edge. *Physics Today* **66**, 60 (2013). DOI: 10.1063/PT.3.2093
260. Chen, K., Still, T., Schoenholz, S., Aptowicz, K.B., Schindler, M., Maggs, A.C., Liu, A.J., and Yodh, A.G., Phonons in two-dimensional soft colloidal crystals. *Physical Review E* **88**, 022315 (2013). PMID:24032840, DOI: 10.1103/PhysRevE.88.022315
261. Devor, D. Bandettini, P.A., Boas, D.A., Bower, J.M., Buxton, R.B., Cohen, L.B., Dale, A.M., Einevoll, G.T., Fox, P.T., Franceschini, M.A, Friston, K.J., Fujimoto, A.G., Geyer, M.A, Greenberg, J.H., Halgren, G., Hämäläinen, M.S, Helmchen, .F, Hyman, B.T, Jasanoff, A., Jernigan, T.L., Judd, L.L., Kim, S.-G. Kleinfeld, D., Kopell, N.J., Kutas, M., Kwong, K.K., Larkum, M.E., Lo, E.H., Magistretti, P.J., Mandeville, J.B., Masliah, E., Mitra, P.P., Mobley, W.C., Moskowitz, MA., Nimmerjahn, A., Reynolds, J.H., Rosen, B.R., Salzberg, B.M., Schaffer, C.B., Silva, G.A., So, P.T.C., Spitzer, N.C., Tootell, R.B., Van Essen, D.C., Vanduffel, W., Vinogradov, S.A., Wald, L.L., Wang, L.V., Weber, B., and Yodh, A.G., The Challenge of Connecting the Dots in the B.R.A.I.N. *Neuron* **80**, 270-274 (2013). PMID:24139032, PMCID:PMC3864648, DOI: 10.1016/j.neuron.2013.09.008
262. Mesquita RC, D'Souza A, Bilfinger TV, Galler RM, Emanuel A, Schenkel, S.S., Yodh, A.G., and Floyd, T.F., Optical Monitoring and Detection of Spinal Cord Ischemia. *PLOS ONE* **8**, e83370 (2013). PMID: 24358279, PMCID: PMC3865183, DOI:10.1371/journal.pone.0083370
263. Yunker, P.J., Lohr, M.A., Still, T., Borodin, A., Durian, D.J., and Yodh, A.G., Comment on "Effects of Particle Shape on Growth Dynamics at Edges of Evaporating Drops of Colloidal Suspensions" *Reply. Physical Review Letters* **111**, 209602 (2013). PMID: 24289714, DOI: 10.1103/PhysRevLett.111.2096012
264. Still, T., Goodrich. C.P., Chen, K., Yunker, P.J., Schoenholz, S., Liu, A.J., and Yodh, A.G., Phonon dispersion and elastic moduli of two-dimensional disordered colloidal packings of soft particles with frictional interactions. *Physical Review E* **89**, 012301 (2014). PMID: 24580221, PMCID: PMC DOI: 10.1103/PhysRevE.89.012301

265. Jeong, J., Davidson, Z.S., Collings, P.J., Lubensky, T.C., and Yodh, A.G., Chiral symmetry breaking and surface faceting in chromonic liquid crystal droplets with giant elastic anisotropy. *Proceedings of the National Academy of Sciences USA* **111**, 1742-1747 (2014). PMID: PMC3918782, DOI:10.1073/pnas.1315121111
266. Busch, D.R., Choe, R., Durduran, T., Friedman, D.H., Baker, W.B., Maidment, A.D., Rosen, M.A., Schnall, M.D., and Yodh, A.G., Blood flow reduction in breast tissue due to mammographic compression. *Academic Radiology* **21**, 151–161 (2014). PMID:24439328, DOI: 10.1016/j.acra.2013.10.009
267. Lynch, J.M., Buckley, E.M., Schwab, P.J., Busch, D.R., Hanna, B.D., Putt, M.E., Licht, D.J., and Yodh, A.G., Noninvasive optical quantification of cerebral venous oxygen saturation in humans. *Academic Radiology* **21**, 162–167 (2014). PMID:24439329, DOI: 10.1016/j.acra.2013.10.013
268. Durduran, T., and Yodh, A.G., Diffuse correlation spectroscopy for non-invasive, microvascular cerebral blood flow measurement. *Neuroimage* **85**, 51-63 (2014). PMID: PMC3991554, DOI: 10.1016/j.neuroimage.2013.06.017
269. Basu, A., Xu, Y., Still, T., Arratia, P.E., Zhang, Z., Nordstrom, K.N., Rieser, J.M., Gollub, J.P., Durian, D.J., and Yodh, A.G., Rheology of soft colloids across the onset of rigidity: scaling behavior, thermal, and non-thermal responses. *Soft Matter*, **10**, 3027-3035 (2014) PMID:24695615, DOI: 10.1039/C3SM52454J
270. Jeong, J., Han, G., Johnson, A.T.C., Collings, P.J., Lubensky, T.C. and Yodh, A.G. Homeotropic alignment of lyotropic chromonic liquid crystals using noncovalent interactions. *Langmuir* **30**, 2914-2920 (2014). PMID:24559290, DOI:10.1021/la404893t
271. Jain, V., Buckley, E.M., Licht, D.J., Lynch, J.M., Schwab, P.J., Naim, M.Y., Lavin, N.A., Nicolson, S.C., Montenegro, L.M., Yodh, A.G. and Wehrli, F.W. Cerebral oxygen metabolism in neonates with congenital heart disease quantified by MRI and optics. *Journal of Cerebral Blood Flow and Metabolism*, **34**, 380-388, (2014). PMID: PMC3948119, DOI:10.1038/jcbfm.2013.214
272. Lohr, M.A., Cavallaro, M., Beller, D.A., Stebe, K.J., Kamien, R.D., Collings, P.J., Yodh, A.G. Elasticity-dependent self-assembly of microtemplated chromonic liquid crystal films. *Soft Matter* **10**, 3477–3484, (2014). PMID:24651876, DOI:10.1039/c3sm53170h
273. Lynch, J.M., Buckley, E.M., Schwab, P.J., McCarthy, A.L., Winters, M.E., Busch, D.R., Xiao, R., Goff, D.A., Nicolson, S.C., Montenegro, L.M., Fuller, S., Gaynor, J.W., Spray, T.L., Yodh, A.G., Naim, M.Y. and Licht, D.J. Time to surgery and preoperative cerebral hemodynamics predict postoperative white matter injury in neonates with hypoplastic left heart syndrome. *Journal of Thoracic and Cardiovascular Surgery*, **148**, 2181-2188 (2014). PMID:25109755, PMID: PMC4254035 DOI:10.1016/j.jtcvs.2014.05.08

274. Kim, M.N., Edlow, B.L., Durduran, T., Frangos, S., Mesquita, R.C., Levine, J.M., Greenberg, J.H., Yodh, A.G., and Detre, J.A., Continuous optical monitoring of cerebral hemodynamics during head-of-bed manipulation in brain-injured adults. *Neurocritical Care*, **20**, 443-453 (2014). PMID: 23653267; PMCID: PMC3883971, DOI 10.1007/s12028-013-9849-7
275. Yunker, P.J., Chen, K., Gratale, M.D., Lohr, M.A., Still, T. and Yodh, A.G. Physics in ordered and disordered colloidal matter composed of poly(N-isopropyl acrylamide) microgel particles. *Reports on Progress in Physics* **77**, 29, (2014). PMID:24801604, DOI:10.1088/0034-4885/77/5/056601
276. Favilla, C.G., Mesquita, R.C., Mullen, M., Durduran, T., Lu, X.P., Kim, M.N., Minkoff, D.L., Kasner, S.E., Greenberg, J.H., Yodh, A.G., and Detre, J.A. Optical bedside monitoring of cerebral blood flow in acute ischemic stroke patients during head-of-bed manipulation. *Stroke* **45**, 1269-1274, (2014). PMID: 24652308, PMCID: PMC4006296, DOI:10.1161/strokeaha.113.004116
277. Choe, R., Putt, M.E., Carlile, P.M., Durduran, T., Giammarco, J.M., Busch, D.R., Jung, K.W., Czerniecki, B.J., Tchou, J., Feldman, M.D., Mies, C., Rosen, M.A., Schnall, M.D., DeMichele, A. and Yodh, A.G. Optically measured microvascular blood flow contrast of malignant breast tumors. *PLOS One* **9**, 10, (2014). PMID:24967878, DOI:10.1371/journal.pone.0099683
278. Mesquita, R.C., Favilla, C.G., Yodh, A.G., and Detre, J.A., Response to letter regarding article, "Optical bedside monitoring of cerebral blood flow in acute ischemic stroke patients during head-of-bed manipulation". *Stroke* **45**, e190 (2014). PMID:25034712, DOI:10.1161/STROKEAHA.114.006125
279. Baker, W.B., Parthasarathy, A.B., Busch, D.R., Mesquita, R.C., Greenberg, J.H., and Yodh, A.G., Modified Beer-Lambert law for blood flow, *Biomedical Optics Express*, **Vol. 5**, No. 11, (2014). PMID: 25426330 DOI:10.1364/BOE.5.004053
280. Edwards, C., Zhou, R.J., Hwang, S.W., McKeown, S.J., Wang, K.Y., Bhaduri, B, Ganti, R., Yunker, P.J., Yodh, A.G., Rogers, J.A., Goddard, L.L., and Popescu, G., Diffraction phase microscopy: monitoring nanoscale dynamics in materials science. *Applied Optics* **53**, G33-G43, (2014). PMID 25322136 DOI: 10.1364/AO.53.000G33
281. Lohr, M.A, Still, T., Ganti, R., Gratale, M.D., Davidson, Z.S., Aptowicz, K.B., Goodrich, C.P., Sussman, D.M., and Yodh, A.G., Vibrational and structural signatures of the crossover between dense glassy and sparse gel-like attractive colloidal packings. *Physical Review E* **90**, 062305 (2014). PMID: 2561501 DOI: <http://dx.doi.org/10.1103/PhysRevE.90.062305>
282. Buckley, E.M., Parthasarathy, A.B., Grant, P.E., Yodh, A.G., and Franceschini, M.A., Diffuse correlation spectroscopy for measurement of cerebral blood flow: future prospects. *Neurophotonics* **1**, 011009 (2014). PMCID: PMC4292799,

doi:10.1117/1.NPh.1.1.011009

283. Peng, Y., Wang, F., Wang, Z., Alsayed, A.M., Zhang, Z., Yodh, A.G., and Han, Y., Two-step nucleation mechanism in solid–solid phase transitions. *Nature Materials*, **14** 101-108 (2015) (Published online 14 September 2014). PMID 25218059 DOI:10.1038/nmat4083
284. Dreyfus, R., Xu, Y., Still, T., Hough, L.A., Yodh, A.G., and Torquato, S., Diagnosing hyperuniformity in two-dimensional, disordered, jammed packings of soft spheres. *Physical Review E* **91**, 012302 (2015). PMID: 25679618 DOI: 10.1103/PhysRevE.91.012302
285. Rieser, J.M., Arratia, P.E., Yodh, A.G., Gollub, J.P. and Durian, D.J., Tunable capillary-induced attraction between vertical cylinders. *Langmuir* **31**, 2421-2429 (2015). PMID: 25646573 DOI: 10.1021/la5046139
286. Sanborn, M.R., Edsell, M.E., Kim, M.N., Mesquita, R., Putt, M.E., Imray, C, Yow, H., Wilson, M.H., Yodh, A.G., Grocott, M., and Martin, D.S., Cerebral hemodynamics at altitude: effects of hyperventilation and acclimatization on cerebral blood flow and oxygenation. *Wilderness & Environmental Medicine*, **26**, 133-141, (2015). PMID: 25797567 DOI:10.1016/j.wem.2014.10.001
287. Jeong, J., Kang, L, Davidson, Z.S., Collings, P.J., Lubensky, T.C., and Yodh, A.G., Chiral structures from achiral liquid crystals in cylindrical capillaries. *Proceedings of the National Academy of Sciences*, **112**, (2015). PMCID: PMC4403180 DOI:10.1073/pnas.1423220112
288. Davidson, Z.S., Kang, L., Jeong, J., Still, T., Collings, P.J., Lubensky, T.C., and Yodh, A.G., Chiral structures and defects of lyotropic cholesteric liquid crystals induced by saddle-splay elasticity. *Physical Review E* **91**, 050501(Rapid Communications) (2015). PMID: 2606610 DOI: 10.1103/PhysRevE.91.050501
289. Chung, S.H., Feldman, M.D., Martinez, D., Kim, H., Putt, M.E., Busch, D.R., Tchou, J., Czerniecki, B.J., Schnall, M.D., Rosen, M.A., DeMichele, A., Yodh, A.G., and Choe, R., Macroscopic optical physiological parameters correlate with microscopic proliferation and vessel area breast cancer signatures. *Breast Cancer Research* **17** 1-14 (2015). PMCID: PMC4487833 DOI: 10.1186/s13058-015-0578-z
290. Holt, D., Parthasarathy, A.B., Okusanya, O., Keating, J., Venegas, O., Deshpande, C., Karakousis, G., Madajewski, B., Durham, A., Nie, S., Yodh, A.G., and Singhal, S., Intraoperative near-infrared fluorescence imaging and spectroscopy identifies residual tumor cells in wounds. *Journal of Biomedical Optics* **20**, 076002 (2015). PMID: 26160347 DOI:10.1117/1.JBO.20.7.076002
291. Jeong, J., Gross, A., Wei, W-S., Tu, F., Lee, D., Collings, P.J., and Yodh, A.G., Liquid crystal Janus emulsion droplets: preparation, tumbling, and swimming. *Soft Matter* **11**,

6747-6754 (2015).

PMCID: PMC4497968 DOI: 10.1039/C5SM01053E

292. Still, T., Yunker, P.J., Hanson, K., Davidson, Z.S., Lohr, M.A., Aptowicz, K.B., and Yodh, A.G., Hydrogels: Temperature-sensitive hydrogel-particle films from evaporating drops. *Advanced Materials Interfaces* **16**, (2015). DOI: 10.1002/admi.201570078
293. Baker, W.B., Parthasarathy, A.B., Ko, T.S., Busch, D.R., Abramson, K., Tzeng, S., Mesquita, R.C., Durduran, T., Greenberg, J.H., Kung, D.K., and Yodh, A.G., Pressure modulation algorithm to separate cerebral hemodynamic signals from extracerebral artifacts. *Neurophotonics* **2**, 035004 (2015). PMCID: PMC4524732 DOI: 10.1117/1.NPh.2.3.035004
294. Sussman, D.M., Schoenholz, S.S., Xu, Y., Still, T., Yodh, A.G., and Liu, A.J., Strain fluctuations and elastic moduli in disordered solids. *Physical Review E* **92**, 022307 (2015). PMID: 26382406 DOI:10.1103/PhysRevE.92.022307
295. Kogler, A.S., Bilfinger, T.V., Galler, R.M., Mesquita, R.C., Cutrone, M., Schenkel, S.S., Yodh, A.G., and Floyd, T.F., Fiber-optic monitoring of spinal cord hemodynamics in experimental aortic occlusion. *Anesthesiology* **123**, 1362-1373 (2015). PMCID: PMC4679520 doi:10.1097/ALN.0000000000000883
296. Edwards, C., Arbabi, A., Bhaduri, B., Wang, X., Ganti, R., Yunker, P.J., Yodh, A.G., Popescu, G., and Goddard, L.L., Measuring the nonuniform evaporation dynamics of sprayed sessile microdroplets with quantitative phase imaging. *Langmuir* **31**, 11020-11032 (2015). PMID: 26389788 DOI:10.1021/acs.langmuir.5b02148
297. Majmundar, A.J., Lee, D.S.M., Skuli, N., Mesquita, R.C., Kim, M.N., Yodh, A.G., Nguyen-McCarty, M., Li, B., and Simon, M.C., HIF modulation of Wnt signaling regulates skeletal myogenesis *in vivo*. *Development* **142**, 2405-2412 (2015). PMCID: PMC5410864 DOI: 10.1242/dev.123026
298. Li, Z., Baker, W.B., Parthasarathy, A.B., Ko, T.S., Wang, D., Schenkel, S., Durduran, T., Li, G., and Yodh, A.G., Calibration of diffuse correlation spectroscopy blood flow index with venous-occlusion diffuse optical spectroscopy in skeletal muscle. *Journal of Biomedical Optics* **20**, 125005 (2015). PMCID: PMC4688416 DOI: 10.1117/1.JBO.20.12.125005
299. Busch, D.R., Lynch, J.M., Winters, M.E., McCarthy, A.L., Newland, J.J., Ko, T., Cornaglia, M.A., Radcliffe, J., McDonough, J.M., Samuel, J. Matthews, E., Xiao, R., Yodh, A.G., Marcus, C.L., Licht, D.J., and Tapia, I.E., Cerebral blood flow response to hypercapnia in children with obstructive sleep apnea syndrome. *Sleep* **39**, 209-216 (2016). PMCID: PMC4678358 DOI: 10.5665/sleep.5350.
300. Wang, D., Parthasarathy, A.B., Baker, W.B., Gannon, K., Kavuri, V., Ko, T., Schenkel, S., Li, Z., Li, Z., Mullen, M.T., Detre, J.A., and Yodh, A.G., Fast blood flow monitoring

- in deep tissues with real-time software correlators. *Biomedical Optics Express* **7**, 776-797 (2016). PMID: PMC4866455 DOI:10.1364/BOE.7.000776
301. Gratale, M.D., Still, T., Matyas, C., Davidson, Z.S., Lobel, S., Collings, P.J., and Yodh, A.G., Tunable depletion potentials driven by shape variation of surfactant micelles. *Physical Review E* **93**, 050601(Rapid Communications) (2016). PMID: 27300818 DOI: 10.1103/PhysRevE.93.050601
 302. Wei, W-S., Gharbi, M.A., Lohr, M.A., Still, T., Gratale, M.D., Lubensky, T.C., Stebe, K.J., and Yodh, A.G., Dynamics of ordered colloidal particle monolayers at nematic liquid crystal interfaces. *Soft Matter* **12**, 4715-4724 (2016). PMID: 27231588 DOI: 10.1039/C6SM00295A
 303. Wang, H., Li, B., Yodh, A.G., and Zhang, Z., Stimuli-responsive shape switching of polymer colloids by temperature-sensitive absorption of solvent. *Angewandte Chemie International Edition* **55**, 1-5 (2016). PMID: 27409766 DOI: 10.1002/anie.201604294
 304. Busch, D.R., Rusin, C.G., Miller-Hance, W., Kibler, K., Baker, W.B., Heinle, J.S., Fraser, C.D., Yodh, A.G., Licht, D.J., and Brady, K.M., Continuous cerebral hemodynamic measurement during deep hypothermic circulatory arrest. *Biomedical Optics Express* **7**, 3461-3470 (2016). PMID: PMC5030024 DOI:10.1364/BOE.7.003461
 305. Ban, H.Y., Schweiger, M., Kavuri, V.C., Cochran, J.M., Xie, L., Busch, D.R., Katrasnik, J., Pathak, S., Chung, S.H., Lee, K., Choe, R., Czerniecki, B.J., Arridge, S.R., and Yodh, A.G., Heterodyne frequency-domain multispectral diffuse optical tomography of breast cancer in the parallel-plane transmission geometry. *Medical Physics* **43**, 4383-4395 (2016). PMID: PMC4920810 DOI:10.1118/1.4953830
 306. Gratale, M.D., Ma, X., Davidson, Z.S., Still, T., Habdas, P., and Yodh, A.G., Vibrational properties of quasi-two-dimensional colloidal glasses with varying interparticle attraction. *Physical Review E* **94**, 042606 (2016). PMID: 27841543 DOI: 10.1103/PhysRevE.94.042606
 307. Brown, Z., Iwanicki, M.J., Gratale, M.D., Ma, X., Yodh, A.G., and Habdas, P., Correlated rearrangements of disordered colloidal suspensions in the vicinity of the reentrant glass transition. *Europhysics Letters* **115**, 68003 (2016). doi: 10.1209/0295-5075/115/68003
 308. Tromberg, B.J., Zhang, Z., Leproux, A., O'Sullivan, T.D., Cerussi, A.E., Carpenter, P.M., Mehta, R.S., Roblyer, D., Yang, W., Paulsen, K.D., Jiang, S.D., Kaufman, P.A., Yodh, A.G., Chung, S.H., Schnall, M., Snyder, B.S., Hylton, N., Boas, D.A., Carp, S.A., Isakoff, S.J., Mankoff, D., Predicting responses to neoadjuvant chemotherapy in breast cancer: ACRIN 6691 trial of diffuse optical spectroscopic imaging. *Cancer Research* **76**, 5933-5944 (2016). PMID: PMC5148152 DOI: 10.1158/0008-5472.CAN-16-0346
 309. Jeong, J., Cho, Y., Lee, S.Y., Gong, X., Kamien, R.D., Yang, S., and Yodh, A.G., Topography-guided buckling of swollen polymer bilayer films into three-dimensional

- structures. *Soft Matter* **13**, 956-962 (2017). PMID: 28078333 DOI: 10.1039/C6SM02299E
310. Favilla, C.G., Parthasarathy, A.B., Detre, J.A., Yodh, A.G., Mullen, M.T., Kasner, S.E., Gannon, K., and Messe, S.R., Non-invasive respiratory impedance enhances cerebral perfusion in healthy adults. *Frontiers in Neurology* **8**, Article 45 (2017). PMID: PMC5311047 DOI: 10.3389/fneur.2017.00045
 311. Peng, Y., Li, W., Wang, F., Still, T., Yodh, A.G., and Han, Y., Diffusive and martensitic nucleation kinetics in solid-solid transitions of colloidal crystals. *Nature Communications* **8**, Article number: 14978 (2017). PMID: PMC5440677 DOI: 10.1038/ncomms14978
 312. Yazdi, H.S., O'Sullivan, T.D., Leproux, A., Hill, B., Durkin, A., Telep, S., Lam, J., Yazdi, S.S., Police, A.M., Carroll, R.M., Combs, F.J., Stromberg, T., Yodh, A.G., and Tromberg, B.J., Mapping breast cancer blood flow index, composition, and metabolism in a human subject using combined diffuse optical spectroscopic imaging and diffuse correlation spectroscopy. *Journal of Biomedical Optics* **22**, 045003 (2017). PMID: PMC5381696 DOI: 10.1117/1.JBO.22.4.045003
 313. Cochran, J.M., Chung, S.H., Leproux, A., Baker, W.B., Busch, D.R., DeMichele, A.M., Tchou, T., Tromberg, B.J., and Yodh, A.G., Longitudinal optical monitoring of blood flow in breast tumors during neoadjuvant chemotherapy. *Physics in Medicine and Biology*, Volume **62** 4637-4653 (2017). PMID: PMC5584633 DOI: 10.1088/1361-6560/aa6cef
 314. Davidson, Z.S., Huang, Y., Gross, A., Martinez, A., Still, T., Zhou, C., Collings, P.J., Kamien, R.D., and Yodh, A.G., Deposition and drying dynamics of liquid crystal droplets. *Nature Communications* **8**, Article number: 15642 (2017). PMID: PMC5460001 DOI: 10.1038/ncomms15642
 315. Cubuk, E.D., Ivancic, R.J.S., Schoenholz, S.S., Strickland, D.J., Basu, A., Davidson, Z.S., Fontaine, J., Hor, J.L., Huang, Y.-R., Jiang, Y., Keim, N.C., Koshigan, K.D., Lefever, J.A., Liu, T., Ma, X.-G., Magagnosc, D.J., Morrow, E., Ortiz, C.P., Rieser, J.M., Shavit, A., Still, T., Xu, Y., Zhang, Y., Nordstrom, K.N., Arratia, P.E., Carpick, R.W., Durian, D.J., Fakhraai, Z., Jerolmack, D.J., Lee, D., Li, J., Riggleman, R., Turner, K.T., Yodh, A.G., Gianola, D.S., and Liu, A.J., Structure-property relationships from universal signatures of plasticity in disordered solids. *Science* **358**, 1033-1037 (2017). PMID: PMC6047528 DOI: 10.1126/science.aai8830
 316. Baker, W.B., Parthasarathy, A.B., Gannon, K.P., Kavuri, V.C., Busch, D.R., Abramson, K., He, L., Mesquita, R.C., Mullen, M.T., Detre, J.A., Greenberg, J.H., Licht, D.L., Balu, R., Kofke, W.A., and Yodh, A.G., Noninvasive optical monitoring of critical closing pressure and arteriole compliance in human subjects. *Journal of Cerebral Blood Flow & Metabolism* **37**, 2691-2705 (2017). PMID: PMC5536813 DOI: 10.1177/0271678X17709166
 317. Baker, W.B., Li, Z., Schenkel, S.S., Chandra, M., Busch, D.R., Englund, E.K., Schmitz,

- K.H., Yodh, A.G., Floyd, T.F. and Mohler III, E.R., Effects of Exercise Training on Calf Muscle Oxygen Extraction and Blood Flow in Patients with Peripheral Artery Disease. *Journal of Applied Physiology* **123**, 1599-1609 (2017). PMID: 28982943 DOI:10.1152/jappphysiol.00585
318. Leproux, A., O'Sullivan, T.D., Cerussi, A., Durkin, A., Hill, B., Hylton, N., Yodh, A.G., Carp, S.A., Boas, D., Jiang, S.D., Paulsen, K.D., Pogue, B., Roblyer, D., Yang, W., and Tromberg, B.J., Performance assessment of diffuse optical spectroscopic imaging instruments in a 2-year multicenter breast cancer. *Journal of Biomedical Optics* **22**, 121604 (2017). PMID: PMC55995138 DOI: 10.1117/1.JBO.22.12.121604
319. Parthasarathy, A.B, Gannon, K.P., Baker, W.B., Favilla, C.G., Balu, R., Kasner, S.E., Yodh, A.G, Detre, J.A., and Mullen, M.T., Dynamic autoregulation of cerebral blood flow measured non-invasively with fast diffuse correlation spectroscopy. *Journal of Cerebral Blood Flow & Metabolism* **38**, 230-240 (2018). PMID: PMC5951022 DOI: 10.1177/0271678X17747833
320. Dias, C.S., Yunker, P.J., Yodh, A.G., Araújo, N.A.M., and Telo da Gama, M.M., Interaction anisotropy and the KPZ to KPZQ transition in particle deposition at the edges of drying drops. *Soft Matter* **14**, 1903-1907 (2018). PMID: 29465724 DOI: 10.1039/C7SM02136D
321. Yodh, A.G., Biophysical optics in a single voice. *Physics Today* **71**, 56 (2018); DOI: 10.1063/PT.3.3848
322. Busch, D.R., Davis, J., Kogler, A., Galler, R.M., Parthasarathy, A.B., Yodh, A.G., and Floyd, T.F., Laser safety in fiber-optic monitoring of spinal cord hemodynamics: a preclinical evaluation. *Journal of Biomedical Optics* **23**, 065003 (2018). PMID: 29923371 DOI: 10.1117/1.JBO.23.6.065003
323. Pogue, B.W., Zhu, T.C., Ntziachristos, V., Paulsen, K.D., Wilson, B.C., Pfefer, J., Nordstrom, R.J., Litorja, M., Wabnitz, H., Chen, Y., Gioux, S., Tromberg, B.J., and Yodh, A.G., Fluorescence-guided surgery and intervention - An AAPM emerging technology blue paper. *Medical Physics* **45**, 2681-2688 (2018). PMID: 29633297 DOI: 10.1002/mp.12909
324. Martinez, A., Collings, P.J., and Yodh, A.G., Brownian Dynamics of Particles "Dressed" by Chiral Director Configurations in Lyotropic Chromonic Liquid Crystals. *Physical Review Letters* **121**, 177801-1–177801-6 (2018). PMID: 30411945 DOI: 10.1103/PhysRevLett.121.177801
325. He, L., Baker, W.B., Milej, D., Kavuri, V.C., Mesquita, R.C., Busch, D.R., Abramson, K., Jiang, J.Y., Diop, M., St. Lawrence, K., Amendolia, O., Quattrone, F., Balu, R., Kofke, W.A., and Yodh, A.G., Noninvasive continuous optical monitoring of absolute cerebral blood flow in critically ill adults. *Neurophotonics* **5**, 045006 (2018). PMID: PMC6251207 DOI: 10.1117/1.NPh.5.4.045006

326. Lynch, J.M., Ko, T., Busch, D.R., Newland, J.J., Winters, M.E., Mensah-Brown, K., Boorady, T.W., Xiao, R., Nicolson, S.C., Montenegro, L.M., Gaynor, J.W., Spray, T.L., Yodh, A.G., Naim, M.Y., Licht, D.L., Preoperative cerebral hemodynamics from birth to surgery in neonates with critical congenital heart disease. *Journal of Thoracic and Cardiovascular Surgery* **156**, 1657-1664 (2018). PMID: PMC6166233 DOI: 10.1016/j.jtcvs.2018.04.098
327. Cochran, J.M., Busch, D.R., Leproux, A., Zhang, Z., O'Sullivan, T.D., Cerussi, A.E., Carpenter, P.M. Mehta, R.S, Roblyer, D., Yang, W., Paulsen, K.D., Pogue, B., Jiang, S., Kaufman, P.A., Chung, S.H., Schnall, M., Snyder, B.S., Hylton, N., Carp, S.A., Isakoff, S.J., Mankoff, D., Tromberg, B.J., and Yodh, A.G., Tissue oxygen saturation predicts response to breast cancer neoadjuvant chemotherapy within 10 days of treatment. *Journal of Biomedical Optics* **24**, 021202 (2019). (Published online 2018). PMID: PMC6194199 DOI: 10.1117/1.JBO.24.2.021202
328. Ma, X., Davidson, Z.S., Still, T., Ivancic, R.J.S., Schoenholz, S.S., Liu, A.J., and Yodh, A.G., Heterogeneous activation, local structure, and softness in supercooled colloidal liquids. *Physical Review Letters* **122**, 028001 (2019). (Editor's Choice) PMID: 30720295 DOI: 10.1103/PhysRevLett.122.028001
329. Cochran, J.M., Busch, D.R., Lin, L., Minkoff, D.L., Schweiger, M., Arridge, S., and Yodh, A.G., Hybrid time-domain and continuous-wave diffuse optical tomography instrument with concurrent, clinical magnetic resonance imaging for breast cancer imaging. *Journal of Biomedical Optics* **24**, 051409 (2019). PMID: PMC6345326 DOI: 10.1117/1.JBO.24.5.051409
330. Busch, D.R., Balu, R., Baker, W.B., Guo, W., He, L., Diop, M., Milej, D., Kavuri, V., Amendolia, O., St. Lawrence, K., Yodh, A.G., and Kofke, W.A., Detection of Brain Hypoxia Based on Noninvasive Optical Monitoring of Cerebral Blood Flow with Diffuse Correlation Spectroscopy. *Neurocritical Care* **30**, 72-80 (2019). PMID: PMC6528475 DOI: 10.1007/s12028-018-0573-1
331. Kikkawa, J.M., Mele, E., Pinczuk, A, Tosatti, E. and Yodh, A.G., National Academy of Sciences Biographical Memoir of Elias Burstein (1917-2017). Washington DC: National Academy of Sciences. <http://www.nasonline.org/publications/biographical-memoirs/memoir-pdfs/burstein-elias.pdf> (Online Access on February 21, 2019).
332. Ma, X., Liu, J., Zhang, Y., Habdas, P., and Yodh, A.G., Excess entropy and long-time diffusion in colloidal fluids with short-range interparticle attraction. *Journal of Chemical Physics* **150**, 144907 (2019). (Editor's Choice) PMID: 30981231. DOI: 10.1063/1.5091564
333. Forti, R.M., Favilla, C.G., Cochran, J.M., Baker, W.B., Detre, J.A., Kasner, S.E., Mullen, M.T., Messé, S.R., Kofke, A., Balu, R., Kung, D., Pukenas, B.A, Sedora-Roman, N.I., Hurst, R.W., Choudhri, O.A., Mesquita, R.C., and Yodh, A.G., Transcranial optical

- monitoring of cerebral hemodynamics in acute stroke patients during mechanical thrombectomy. *Journal of Stroke and Cerebrovascular Diseases* **28**, 1483-1495 (2019). PMID: PMC6686873 DOI: 10.1016/j.jstrokecerebrovasdis.2019.03.019
334. Mishra, C.K., Habdas, P. and Yodh, A.G., Dynamic heterogeneities in colloidal supercooled liquids: experimental tests of inhomogeneous mode coupling theory. *Journal of Physical Chemistry B* **123**, 5181-5188 (2019). PMID: 31132279 DOI: 10.1021/acs.jpcc.9b03419
335. Li, L.Z., Xu, H.N., and Yodh, A.G., Commemorating Britton Chance. *Molecular Imaging and Biology* **21**, 399-400 (2019). PMID: PMC6525646 DOI: 10.1007/s11307-019-01359-w
336. Mishra, C.K., Ma, X., Habdas, P., Aptowicz, K.B., and Yodh, A.G., Correlations between short- and long-time relaxation in colloidal supercooled liquids and glasses. *Physical Review E* **100**, 020603(R) (2019). PMID: 31574722 doi.org/10.1103/PhysRevE.100.02.0603
337. Baker, W.B., Balu, R., He, L., Kavuri, V.C., Busch, D.R., Amendolia, O., Quattrone, F., Frangos, S., Maloney-Wilensky, E., Abramson, K., Mahanna Gabrielli E., Yodh, A.G., and Kofke, W.A., Continuous non-invasive optical monitoring of cerebral blood flow and oxidative metabolism after acute brain injury. *Journal of Cerebral Blood Flow & Metabolism* **39**, 1469-1485 (2019). PMID: PMC6681541 DOI: 10.1177/0271678X19846657
338. Milej, D., He, L., Abdalmalak, A., Baker, W.B., Anazodo, U.C., Diop, M., Dolui, S., Kavuri, V.C., Pavlosky, W., Wang, L., Balu, R., Detre, J.A., Amendolia, O., Quattrone, F., Kofke, W.A., Yodh, A.G., and St. Lawrence, K., Quantification of cerebral blood flow in adults by contrast-enhanced near-infrared spectroscopy: validation against MRI. *Journal of Cerebral Blood Flow & Metabolism* **0**, 1-13 (2019). PMID: 31500522 doi.org/10.1177/0271678X19872564
339. Mullen, M.T., Parthasarathy, A.B., Zandieh, A., Baker, W.B., Mesquita, R.C., Loomis, C., Torres, J., Guo, W., Favilla, C.G., Messé, S.R., Yodh, A.G., Detre, J.A., and Kasner, S.E., Cerebral blood flow response during bolus normal saline infusion after ischemic stroke. *Journal of Stroke and Cerebrovascular Diseases* **28**, 104294. (2019). PMID: 31416759 doi 10.1016/j.jstrokecerebrovasdis.2019.07.010.
340. Favilla, C.G., Forti, R.M., Zamzam, A., Detre, J.A., Mullen, M.T., Yodh, A.G., Kasner, S.E., Busch, D.R., Baker, W.B., Mesquita, R.C., Kung, D., and Messé, S.R., Perfusion Enhancement with Respiratory Impedance After Stroke (PERI-Stroke), *Neurotherapeutics* (2019). PMID: 31140115 doi.org/10.1007/s13311-019-00744-1.
341. Wei, W. S., Xia, Y., Ettinger, S., Yang, S. and Yodh, A. G. Molecular heterogeneity drives reconfigurable nematic liquid crystal drops. *Nature* **576**, 433-436 (2019). PMID: 31853082, PMID: PMC6927531. doi:10.1038/s41586-019-1809-8.

342. White, B.R., Padawer-Curry, J.A., Cohen, A.S., Licht, D.J., and Yodh, A.G., Brain segmentation, spatial censoring, and averaging techniques for optical functional connectivity imaging in mice. *Biomedical Optics Express* **10**, 5952-5973 (2019). PMID: 31799057, PMCID: PMC6865125. DOI: 10.1364/BOE.10.005952.
343. Ong, Y.H., Dimofte, A., Kim, M.M., Finlay, J.C., Sheng, T.Q., Singhal, S., Cengel, K.A., Yodh, A.G., Busch, T.M., and Zhu, T.C., Reactive Oxygen Species Explicit Dosimetry for Photofrin-mediated Pleural Photodynamic Therapy. *Photochemistry and Photobiology* **20**, 340-348 (2020). PMID: 31729774, PMCID: PMC7299188. DOI: 10.1111/php.13176.
344. Novi, S.L., Roberts, E., Spagnuolo, D., Spilsbury, B.M., Price, D.C., Imbalzano, C.A., Forero, E., Yodh, A.G., Tellis, G.M., Tellis, C.M., and Mesquita, R.C., Functional near-infrared spectroscopy for speech protocols: characterization of motion artifacts and guidelines for improving data analysis. *Neurophotonics* **7**, 015001 (2020). PMID: 31956662, PMCID: PMC6953699. DOI: 10.1117/1.NPh.7.1.015001.
345. Ko, T.S., Mavroudis, C.D., Baker, W.B., Morano, V.C., Mensah-Brown, K., Boorady, T.W., Schmidt, A.L., Lynch, J.M., Busch, D.R., Gentile, J., Bratinov, G., Lin, Y.X., Jeong, S., Melchior, R.W., Rosenthal, T.M., Shade, B.C., Schiavo, K.L., Xiao, R., Gaynor, J.W., Yodh, A.G., Kilbaugh, T.J., and Licht, D.J., Non-invasive optical neuromonitoring of the temperature-dependence of cerebral oxygen metabolism during deep hypothermic cardiopulmonary bypass in neonatal swine. *Journal of Cerebral Blood Flow and Metabolism* **40**, 187-203 (2020). PMID: 30375917, PMCID: PMC6928559. DOI: 10.1177/0271678X18809828.
346. Xu, Y., Ge, D., Calderon-Ortiz, G. A., Exarhos, A. L., Bretz, C., Alsayed, A., Kurz, D., Kikkawa, J. M., Dreyfus, R., Yang, S., Yodh, A. G. Highly conductive and transparent coatings from flow-aligned silver nanowires with large electrical and optical anisotropy. *Nanoscale* **12**, 6438–6448 (2020). <https://doi.org/10.1039/c9nr09598e>.
347. Busch, D.R., Baker, W.B., Mavroudis, C.D., Ko, T., Lynch, J.M., McCarthy, A.L., DuPont-Thibodeau, G., Buckley, E.M., Jacobwitz, M., Boorady, T.W., Mensah-Brown, K., Connelly, J.T., Yodh, A.G., Kilbaugh, T.J., and Licht, D.J., Noninvasive optical measurement of microvascular cerebral hemodynamics and autoregulation in the neonatal ECMO patient. *Pediatric Research* **13** (2020). PMID: 32172282, PMCID: PMC7492409. DOI: 10.1038/s41390-020-0841-6.
348. Galloway, K. Lawrence, Ma, Xiaoguang, Keim, Nathan C., Jerolmack, Douglas J., Yodh, Arjun G., and Arratia, Paulo E., Scaling of relaxation and excess entropy in plastically deformed amorphous solids. *Proceedings of the National Academy of Sciences* **117**, 11887-11893 (2020). PMID: 32430317. PMCID: PMC7275772. <https://doi.org/10.1073/pnas.2000698117>.
349. Busch, D.R., Lin, W., Cai, C., Cutrone, A., Tatka, J., Kovarovic, B.J., Yodh, A.G., Floyd, T.F., Barsi, J., Multi-site optical monitoring of spinal cord ischemia during spine

- distraction. *Journal of Neurotrauma*. **37** 1933-2027 (2020). PMID: 32458719, PMCID: PMC7470219. DOI: 10.1089/neu.2020.7012.
350. Ong, Y.H., Miller, J., Yuan, M., Chandra, M., El Khatib, Vinogradov, S.A., Putt, M.E., Zhu, T.C., Cengel, K.A., Yodh, A.G., and Busch, T.M., Blood flow measurements enable optimization of light delivery for personalized photodynamic therapy. *Cancers* **12**, (2020). PMID: 32549354, PMCID: PMC7353010. DOI: 10.3390/cancers12061584.
351. Li, Wei, Peng, Yi, Zhang, Yongjun, Still, Tim, Yodh, A.G., Han, Yilong, Shear-assisted grain coarsening in colloidal polycrystals. *Proceedings of the National Academy of Sciences* **117**, 24055-24060 (2020). PMID: 32938800, PMCID: PMC7533838. DOI: <https://doi.org/10.1073/pnas.2013456117>.
352. Fisher, J.A.N., Gumenchuk, I., Rogovin, O.S., Yodh, A.G., and Busch, D.R., Asymmetric, dynamic adaptation in prefrontal cortex during dichotic listening tasks. *Neurophotonics* **7**, 045008 (2020). PMID: 33163546, PMCID: PMC7641958. <https://doi.org/10.1117/1.NPh.7.4.045008>.
353. Padawer-Curry, J.A., Jahnvi, J., Breimann, J.S., Licht, D.L., Yodh, A.G., Cohen, A.S., and White, B.R., Variability in atlas registration of optical intrinsic signal imaging and its effect on functional connectivity analysis. *J. Opt. Soc. Am. A*. **38**, 245-252 (2021). PMID: 33690536, PMCID: PMC7993363. <https://doi.org/10.1364/JOSAA.410447>.
354. White, B.R., Padawer-Curry, J.A., Ko, T., Baker, W., Breimann, J., Cohen, A.S., Licht, D.J., and Yodh, A.G., Wavelength censoring for spectroscopy in optical functional neuroimaging. *Physics in Medicine & Biology*. **66**, 065026 (2021). PMID: 33326946, PMCID: PMC8059274. <https://doi.org/10.1088/1361-6560/abd418>.
355. Cochran, J.M., Leproux, A., Busch, D.R., O'Sullivan, T.D., Yang, W., Mehta, R.S., Police, A.M., Tromberg, B.J., and Yodh, A.G., Breast cancer differential diagnosis using diffuse optical spectroscopic imaging and regression with z-score normalized data *Journal of Biomedical Optics* **26**, 026004 (2021). PMID: 33624457, PMCID: PMC7901858. <https://doi.org/10.1117/1.JBO.26.2.026004>.
356. Ko, T.S., Mavroudis, C.D., Morgan, R.W., Baker, W.B., Marquez, A.M., Boorady, T.W., Devarajan, M., Lin, Y., Roberts, A.L., Landis, W.p., Mensah-Brown, K., Nadkarni, V.M., Berg, R.A., Sutton, R.M., Yodh, A.G., Licht, D.J., Guo, W., and Kilbaugh, T.J., Non-invasive diffuse optical neuromonitoring during cardiopulmonary resuscitation predicts return of spontaneous circulation. *Science Reports* **11**, 3828 (2021). PMID: 33589662, PMCID: PMC7884428. <https://doi.org/10.1038/s41598-021-83270-5>.
357. Gregori-Pla, C., Mesquita, R.C., Favilla, C.G., Busch, D.R., Blanco, I., Zirak, P., Kobayashi Frisk, L., Avtzi, S., Maruccia, F., Giacalone, G., Cotta, G., Camps-Renom, P., Mullen, M.T., Martí-Fàbregas, J., Prats-Sánchez, L., Martínez-Domeño, A., Kasner, S.E., Greenberg, J.H., Zhou, C., Edlow, B.L., Putt, M.E., Detre, J.A., Yodh, A.G., Durduran, T., and Delgado-Mederos, R., Blood flow response to orthostatic challenge identifies

- signatures of the failure of static cerebral autoregulation in patients with cerebrovascular disease. *BMC Neurology* **21**, 154 (2021). PMID: 33836684, PMCID: PMC8033703. <https://doi.org/10.1186/s12883-021-02179-8>.
358. Busch, D.R., Lin, W., Goh, C.C., Gao, F., Larson, N., Wahl, J., Bilfinger, T.V., Yodh, A.G., and Floyd, T.F., Towards rapid intraoperative axial localization of spinal cord ischemia with epidural diffuse correlation monitoring. *PLOS ONE* **16**, e0251271 (2021). PMID: 33970932, PMCID: PMC8109798. <https://doi.org/10.1371/journal.pone.0251271>.
359. Padawer-Curry, J.A., Volk, L.E., Mavroudis, C.D., Ko, T.S., Morano, V.C., Busch, D.R., Rosenthal, T.M., Melchior, R.W., Shade, B.C., Schiavo, K.L., Boorady, T.W., Schmidt, A.L., Andersen, K.N., Breimann, J.S., Jahnavi, J., Mensah-Brown, K.G., Yodh, A.G., Mascio, C.E., Kilbaugh, T.J., Licht, D.J., White, B.R., and Baker, W.B., Effects of circulatory arrest and cardiopulmonary bypass on cerebral autoregulation in neonatal swine. *Pediatric Research* **435**, 1-9 (2021). PMID: 33947997, PMCID: PMC8566324. <https://doi.org/10.1038/s41390-021-01525-3>.
360. Ma, X., Mishra, C.K., Habdas, P., and Yodh, A.G., Structural and short-time vibrational properties of colloidal glasses and supercooled liquids in the vicinity of the re-entrant glass transition. *Journal of Chemical Physics* **155**, 074902 (2021). <https://doi.org/10.1063/5.0059084>.
361. Rubtsova, N.I., Hart, M.C., Arroyo, A.D., Osharovich, S.A., Liebov B.K., Miller, J., Yuan, M., Cochran, J.M., Chong, S., Yodh, A.G., Busch, T.M., Delikatny, E.J., Anikeeva, N., and Popov, A.V., NIR Fluorescent Imaging and Photodynamic Therapy with a Novel Theranostic Phospholipid Probe for Triple-Negative Breast Cancer Cells. *Bioconjugate Chemistry* **32**, 1852–1863 (2021). <https://doi.org/10.1021/acs.bioconjchem.1c00295>.
362. Flanders, T.M., Lang S, Ko, T.S., Andersen, K.N, Jahnavi, J., Flibotte, J.N., Licht, D.L., Tasian, G.E., Sotardi, S.T., Yodh, A.G., Lynch, J.M., Kennedy, B.C., Storm, P.B., White B.R., Heuer, PG., Baker, W.B., Optical detection of intracranial pressure and perfusion changes in neonates with hydrocephalus. *Journal of Pediatrics*. **236**, 54-61 (2021). PMID: 34004191, PMCID: PMC8403158. <https://doi.org/10.1016/j.jpeds.2021.05.024>.
363. Li, Z., Englund, E.K., Langham, M.C., Feng, J., Jia, K., Floyd, T.F., Yodh, A.G., and Baker, W.B., Exercise training increases resting calf muscle oxygen metabolism in patients with peripheral artery disease. *Metabolites* **11**, 814 (2021). PMID:34940572, PMCID: PMC8706023. <https://doi.org/10.3390/metabo11120814>.
364. Lynch, J.M., Mavroudis, C.D., Ko, T.S., Jacobwitz, M., Busch, D.R., Xiao, R., Nicolson, S.C., Montenegro, L.M., Gaynor, J.W., Yodh, A.G., and Licht, D.J., Association of ongoing cerebral oxygen extraction during deep hypothermic circulatory arrest with postoperative brain injury. *Seminars in Thoracic and Cardiovascular Surgery*. **34**, 1275-1284 (2022). ISSN: 1043-0679. PMID: 34508811, PMCID: PMC8901799. <https://doi.org/10.1053/j.semtcvs.2021.08.026>.

365. Ettinger, S., Dietrich, C.F., Mishra, C.K., Miksch, C., Beller, D.A., Collings, P.J., and Yodh, A.G., Rods in a lyotropic cholesteric liquid crystal: emergence of chirality, symmetry-breaking alignment, and caged angular diffusion. *Soft Matter* **18**, 487-495 (2022). <https://doi.org/10.1039/D1SM01209F>.
366. Galloway, K.L., Teich, E.G., Ma, X.G., Kammer, C.H., Graham, I.R., Keim, N.C., Reina, C., Jerolmack, D.J., Yodh, A.G., and Arratia, P.E., Relationships between structure, memory and flow in sheared disordered materials. *Nature Physics* **18**, 1-7 (2022). <https://doi.org/10.1038/s41567-022-01536-9>.
367. de la Cotte, A., Stenull, O., Ettinger, S., Collings, P.J., Lubensky, T.C., and Yodh, A.G., Giant director fluctuations in liquid crystal drops. *Physical Review E* **105**, 044702 (2022). DOI: 10.1103/PhysRevE.105.044702.
368. Stenull, O., de la Cotte, A., Ettinger, S., Collings, P.J., Yodh, A.G., and Lubensky, T.C., Theory of director fluctuations about a hedgehog defect in a nematic drop. *Physical Review E* **105**, 044703 (2022). DOI: 10.1103/PhysRevE.105.044703.
369. Wei, W.S., Jeong, J., Collings, P.J., and Yodh, A.G., Focal conic flowers, dislocation rings, and undulation textures in smectic liquid crystal Janus droplets. *Soft Matter* **18**, 4360-4271. (2022). DOI: 10.1039/D1SM01623G.
370. White, B.R., Ko, T.S., Morgan, R.W., Baker, W.B., Benson, E.J., Lafontant, A., Starr, J.P., Landis, W.P., Andersen, K., Jahnavi, J., Breimann, J., Delso, N., Morton, S., Roberts, A.L, Lin, Y., Graham, K., Berg, R.A., Yodh, A.G., Licht, D.L., and Kilbaugh, T.J., Low frequency power in cerebral blood flow is a biomarker of neurologic injury in the acute period after cardiac arrest. *Resuscitation* **178**, 12-18 (2022). PMID: 35817269 PMCID: PMC9580006. doi.org/10.1016/j.resuscitation.2022.07.004.
371. Tanaka, M., Wang, X., Mishra, C.K., Cai, J., Feng, J., Kamien, R.D., and Yodh, A.G., Ratchetlike motion of helical bilayers induced by boundary constraints. *Physical Review E* **106**, L012605 (2022). <https://doi.org/10.1103/PhysRevE.106.L012605>.
372. Wang, L., Cochran, J.M., Ko, T., Baker, W.B., Abramson, K., He, L., Busch, D.R., Kavuri, V., Linn, R.L., Parry, S., Yodh, A.G., and Schwartz, N., Non-invasive monitoring of blood oxygenation in human placentas via concurrent diffuse optical spectroscopy and ultrasound imaging. *Nature Biomedical Engineering* **6** 1017-1030 (2022). doi.org/10.1038/s41551-022-00913-2. PMCID: PMC9944515
373. Lafontant, A., Gabrielli, E.M., Bergonzi, K., Forti, R., Ko, T., Shah, R., Arkles, J., Licht, D., Yodh, A.G., Kofke, W.A., White, B., and Baker, W., Comparison of optical measurements of critical closing pressure acquired before and during induced ventricular arrhythmia in adults. *Neurophotonics* **9**, 035004-1-035004-11 (2022). PMID: 36039170, PMCID: PMC9407009. DOI: 10.1117/1.NPh.9.3.035004.

374. Ayaz, H., Baker, W.B., Blaney, G., Boas, D.A., Bortfeld, H., Brady, K., Brake, J., Brigadoi, S., Buckley, E.M., Carp, S.A., Cooper, R.J., Cowdrick, K.R., Culver, J.R., Dan, I., Dehghani, H., Devor, A., Durduran, T., Eggebrecht, A.T., Emberson, L.L., Fang, Q., Fantini, S., Franceschini, M.A., Fischer, J.B., Gervain, J., Hirsch, J., Hong, K.S., Horstmeyer, R., Kainerstorfer, J.M., Ko, T.S., Licht, D.J., Liebert, A., Luke, R., Lynch, J.M., Mesquida, J., Mesquita, R.C., Naseer, N., Novij S.L, Orihuela-Espina, F., O'Sullivan, T.D., Peterka, D.S., Pifferi, A., Pollonini, L, Sassaroli, A., Ricardo Sato, J., Scholkmann, F., Spinelli, L., Srinivasan, V.J., St. Lawrence, K., Tachtsidis, I., Tong, Y., Torricelli, A., Urner, T., Wabnitz, H, Wolf, M., Wolf, U., Xu, S., Yang, C., Yodh, A.G., Yücel, M.A, and Zhou, W., Optical imaging and spectroscopy for the study of the human brain: status report. *Neurophotonics*, **9**, S24001-1-S24001-65 (2022). PMID: 36052058 PMCID: PMC9424749. doi.org/10.1117/1.NPh.9.S2.S24001.
375. Chong, S.H., Ong, Y., El Khatib, M., Allu, S.R., Parthasarathy, A.B., Greenberg, J.H., Yodh, A.G., and Vinogradov, S.A., Real-time tracking of brain oxygen gradients and blood flow during functional activation. *Neurophotonics* **9** 045006 (2022). PMID: 36457848, PMCID: PMC9704417. doi.org/10.1117/1.NPh.9.4.045006.
376. Chong, S.H., Markel, V.A., Parthasarathy, A.B., Ong, Y., Abramson, K., Moscatelli, F.A., and Yodh, A.G., Algorithms and instrumentation for rapid spatial frequency domain fluorescence diffuse optical imaging. *Journal of Biomedical Optics* **27** 116002 (2022). PMID: 36348511, PMCID: PMC9641268. doi.org/10.1117/1.JBO.27.11.116002.
377. Ko, T.S., Mavroudis, C.D., Benson, E.J., Forti, R.M., Melchior, R.W., Boorady, T.W., Morano, V.C., Mensah-Brown, K., Lin, Y., Aronowitz, D., Starr, J.P., Rosenthal, T.M., Shade, B.C., Schiavo, Kellie L; White, Brian R; Lynch, Jennifer M; Gaynor, J.W., Licht, D.J., Yodh, A.G., Baker, W.B., Correlation of Cerebral Microdialysis with Non-Invasive Diffuse Optical Cerebral Hemodynamic Monitoring during Deep Hypothermic Cardiopulmonary Bypass. *Metabolites* **12** 737 (2022). PMID: 36005609, PMCID: PMC9416552. ISSN: 2218-1989. DOI: 10.3390/metabo12080737.
378. Luckl, J., Baker, W., Boda, K., Emri, M., Yodh, A.G., and Greenberg, J.H., Oxyhemoglobin and Cerebral Blood Flow Transients Detect Infarction in Rat Focal Brain Ischemia. *Neuroscience* **509**, 132-144 (2023). ISSN: 0306-4522, PMID: 36460221, PMCID: PMC9852213. DOI: 10.1016/j.neuroscience.2022.11.028.
379. Licht, D.J., Jacobowitz, M., Lynch, J.M., Ko, T., Boorady, T., Devarajan, M., Heye, K.N., Mensah-Brown, K., Newland, J.J., Schmidt, A., Schwab, P., Winters, M., S.C, Nicolson, Montenegro, L.M., Fuller, S., Mascio, C., Gaynor, J.W., Yodh, A.G., Gebb, J., Vossough, A., Choi, G.H., and Putt, M.E., Impaired Maternal-Fetal Environment and Risk for Preoperative Focal White Matter Injury in Neonates With Complex Congenital Heart Disease. *Journal of the American Heart Association* **12**, e025516 (2023). PMID: 36974759, PMC10122900. doi.org/10.1161/JAHA.122.025516.
380. Favilla, C.G., Mullen, M.T., Kahn, F., Rasheed, I-Y.D., Messe, S.R., Parthasarathy, A.B., and Yodh, A.G., Dynamic cerebral autoregulation measured by diffuse correlation

- spectroscopy. *Journal of Cerebral Blood Flow & Metabolism*, (OnlineFirst, January 26, 2023), **43** 1317-1327 (2023). PMID: 36703572 PMCID: PMC10369149. doi.org/10.1177/0271678X231153728.
381. Hill, A., Tanaka, M., Aptowicz, K.B., Mishra, C.K., Yodh, A.G., and Ma, X., Depletion-driven antiferromagnetic, paramagnetic, and ferromagnetic behavior in quasi-two-dimensional buckled colloidal solids. *Journal of Chemical Physics* **158**, 194903, (2023). doi.org/10.1063/5.0146155.
382. Forti, R.M., Hobson, L.J., Benson, E.J., Ko, T.S., Ranieri, N.R., Laurent, G., Weeks, M.K., Widmann, N.J., Morton, S., Davis, A.M., Sueishi, T., Lin, Y., Wulwick, K.S., Fagan, N., Shin, S.S., Kao, S-H., Licht, D.J., White, B.R., Kilbaugh, T.J., Yodh, A.G., and Baker, W.B., Non-invasive diffuse optical monitoring of cerebral physiology in an adult swine-model of impact traumatic brain injury. *Biomedical Optics Express* **14**, 2432-2448, (2023). PMID: 37342705 PMCID: PMC10278631. <https://doi.org/10.1364/BOE.486363>.
383. Barbhuiya, N.H., Yodh, A.G. and Mishra, C.K. Direction-dependent dynamics of colloidal particle pairs and the Stokes-Einstein relation in quasi-two-dimensional fluids. *Nature Communications* **14**, 5109 (2023). <https://doi.org/10.1038/s41467-023-40772-2>.
384. Peng, Y., Li, W., Still, T., Yodh, A.G., and Han, Y., In situ observation of coalescence of nuclei in colloidal crystal-crystal transitions. *Nature Communications* **14**, 4905 (2023). <https://doi.org/10.1038/s41467-023-40627-w>.
385. Ettinger, S., Slaughter, C.G., Parra, S.H., Kikkawa, J.M., Collings, P.J., and Yodh, A.G., Magnetic-field-driven director configuration transitions in radial nematic liquid crystal droplets. *Physical Review E* **108**, 024704 (2023). DOI: 10.1103/PhysRevE.108.024704.
386. Favilla, C.G., Forti, R.M., Carter, S., Kofke, W.A., Kasner, S.E., Baker, W.B., Yodh, A.G., Messe, S.R., Cummings, S., Kung, D.K., Burkhardt, J.K., Pukenas, B., Srinivasan, V.M., Hurst, R.W., and Detre, J.A., Microvascular reperfusion during endovascular therapy: the balance of supply and demand. *Journal of Neurointerventional Surgery*, (Epub ahead of print: October 28, 2023), **Volume 3 S2**. PMID: 37898551 PMCID: PMC11055937. doi:10.1136/jnis-2023-020834.
387. Benson, E.J., Aronowitz, D.I., Forti, R.M., Lafontant, A., Ranieri, N.R., Starr, J.P., Melchior, R.W., Lewis, A., Jahnavi, J., Breimann, J., Yun, B., Laurent, G.H., Lynch, J.M., White, B.R., Gaynor, J.W., Licht, D.J., Yodh, A.G., Kilbaugh, T.J., Mavroudis, C.D., Baker, W.B., and Ko, T.S., Diffuse Optical Monitoring of Cerebral Hemodynamics and Oxygen Metabolism during and after Cardiopulmonary Bypass: Hematocrit Correction and Neurological Vulnerability. *Metabolites* **13**, 1153 (2023). PMID: 37999249 PMCID: PMC10672802. doi.org/10.3390/metabo13111153.
388. Favilla, C. G., Carter, S., Hartl, B., Gitlevich, R., Mullen, M.T., Yodh, A.G., Baker, W. B., and Konecky, S., Validation of the Openwater wearable optical system: cerebral

- hemodynamic monitoring during a breath-hold maneuver. *Neurophotonics* **11**, 015008 (2024). PMID: 38464864 PMCID: PMC10923543. doi.org/10.1117/1.NPh.11.1.015008.
389. Favilla, C. G., Baird GL, Grama K., Konecky, S., Carter, S., Smith, W., Gitlevich, R., Lebron-Cruz, A., Yodh, A. G., McTaggart, R. A., Portable cerebral blood flow monitor to detect large vessel occlusion in patients with suspected stroke, *Journal of NeuroInterventional Surgery* Published Online First: 21 March 2024. PMID: 38514189. doi: 10.1136/jnis-2024-021536
390. Pogue, B. W, Zhu, T. C, Ntziachristos, V., Wilson, B. C., ; Paulsen, K. D., Gioux, S., Nordstrom, R., Pfefer, J. T., Tromberg, B. J., Wabnitz, H., Yodh, A., Chen, Y., Litorja, M., AAPM Task Group Report 311: Guidance for performance evaluation of fluorescence-guided surgery systems, *Medical Physics* **Vol.51(2)**, p.740-771 (2024). PMID: 38054538. ISSN: 0094-2405, 2473-4209; DOI: 10.1002/mp.16849
391. Skuli, N., Majmundar, A. J., Krock, B. L., Mesquita, R. C., Mathew, L. K., Quinn, Z. L., Runge, A., Liu, L., Kim, M. N., Liang, J., Schenkel, S., Yodh, A. G., Keith, B., Simon, M. C., Endothelial HIF-2 α regulates murine pathological angiogenesis and revascularization processes (Corrigendum), *Journal of Clinical Investigation* **134(8)**, e180863 (2024). PMID: 38618964 PMCID: PMC11014647. doi.org/10.1172/JCI180863.
392. Greenwood, J.C., Morgan, R.W., Abella, B.S., Shofer, F.S., Baker, W.B., Lewis, A., Ko, T.S., Forti, R.M., Yodh, A.G., Kao, S-H, Kilbaugh, T.J., Jang, D.H., Carbon monoxide as a cellular protective agent in a swine model of cardiac arrest protocol, *PLOS ONE* **19(5)**, e0302653 (2024). PMID: 38748750 PMCID: PMC11095756. doi.org/10.1371/journal.pone.0302653
393. Matlis, G.C., Zhang, Q., Benson, E.J., Weeks, M.K., Andersen, K., Jahnavi, J., Lafontant, A., Breimann, J., Hallowell, T., Lin, Y., Licht, D.J., Yodh, A.G., Kilbaugh, T.J., Forti, R.M., White, B.R., Baker, W.B., Xiao, R., Ko, T.S., Tiffany S. Ko, Chassis-based fiber-coupled optical probe design for reproducible quantitative diffuse optical spectroscopy measurements. *PLOS ONE* **19(7)**: e0305254 (2024). PMID: 39052686 PMCID: PMC11271963. doi.org/10.1371/journal.pone.0305254
394. Baker, W.B., Forti, R.M., Heye, P., Heye, K., Lynch, J.M., Yodh, A.G., Licht, D.J., White, B.R., Hwang, M., Ko, T.S., Kilbaugh, T.J., Modified Beer-Lambert algorithm to measure pulsatile blood flow, critical closing pressure, and intracranial hypertension, *Biomed. Opt. Express* **15**, 5511-5532 (2024). doi.org/10.1364/BOE.529150

INVITED TALKS

University of Maryland, Department of Chemistry, Fall 1985 (Seminar).

Aerospace Corporation, Los Angeles, CA, January 1986 (Seminar).

Los Alamos National Lab, Los Alamos, New Mexico, January 1986 (Seminar).

IBM Watson Research Center, Yorktown Heights, NY, Feb. 1986 (Seminar).
AT&T Bell Laboratories, Murray Hill, NJ, Feb. 1986 (Seminar).
AT&T Bell Laboratories, Holmdel, NJ, January 1988 (Seminar).
University of Nebraska, Department of Physics, January 1988 (Colloquium).
Columbia University, Department of Physics, February 1988 (Seminar).
Yale University, Department of Physics, February, 1988 (Seminar).
Georgia Tech University, Department of Physics, February, 1988 (Colloquium).
University of Rhode Island, Department of Physics, February, 1988 (Seminar).
University of Delaware, Department of Physics, February, 1988 (Seminar).
University of Rochester, Department of Physics, February, 1988 (Seminar).
Michigan State University, Department of Physics, March 1988 (Seminar).
Purdue University, Department of Physics, March 1988 (Colloquium).
Case Western Reserve University, Department of Physics, March 1988 (Colloquium).
UCLA, Department of Physics, March, 1988 (Colloquium).
University of Pennsylvania, Department of Physics, March 1988 (Seminar).
UC Davis, Department of Physics, March 1988 (Seminar).
Bryn Mawr College, PA, November 1989 (Colloquium).
The Fourth Binational US-USSR Symposium on "The Physics of Optical Phenomena and Their Use as Probes of Matter," Irvine, CA, Jan. 1990 (Invited Talk).
Medical School, University of Pennsylvania, Philadelphia, PA, October 1990. (Seminar)
Hercules Inc., Wilmington, Delaware, October 1990 (Seminar).
Rowland Institute of Science/Harvard, Boston, MA, January 1991 (Seminar).
University of Pennsylvania, Dept. of Chemistry, Philadelphia, PA, March 1991 (Seminar).
Structure Seminar, Laboratory for Research on Structure of Matter, Univ. of PA, 1991 (Seminar).
Johns Hopkins University, Dept. of Biophysics, Baltimore, Md., April 1991 (Seminar).
Symposium on *Nonlinear Optics of Organic and Polymer Systems and Photonic Devices*, Philadelphia, PA, April 1991 (Invited Talk).
1991 IEEE/MTT-S International Microwave Symposium, Session BB: *Time-Resolved Spectroscopy and Imaging of Tissue*, Boston, MA, June 1991 (Invited Talk).
Naval Ocean Science Center, Dept. Solid State Electronics, San Diego CA, Aug. 1991 (Seminar).
Naval Weapons Center, Department of Physics, China Lake CA, August 1991 (Seminar).
180th Meeting of the Electrochemical Society, Nonlinear Optics and Materials Session (Phoenix Arizona, (Oct. 13-17, 1991) (Invited Talk).
Yale University, Department of Physics, New Haven, Conn., Feb. 1992 (Colloquium).
Exxon Research Lab, East Annandale, NJ, March 1992, (Condensed Matter Seminar).

Optical Society of America, *8th Topical Meeting on Photon Correlation and Scattering*, Boulder, CO, Aug. 24-26, 1992 (Invited Talk).

Johnson Foundation, PENN, *Photon Migration in Physics, Biology, & Chemistry*, January 1992 (Seminar).

Indiana University of PA, Department of Physics, April 1992 (Colloquium).

Queen's College, Department of Physics, NY, May 1992 (Colloquium).

University of Delaware, Department of Physics, May 1992 (Seminar).

ICI Specialties, Wilmington Delaware, July 1992 (Seminar).

Annual Meeting of the American Chemical Society, Washington DC, August 24-28, 1992 (Invited Talk).

University of Pennsylvania, Department of Physics, September 1992 (Colloquium).

Optical Society of America Annual Meeting, Albuquerque, NM, September 20-25, 1992 (Invited Talk).

Princeton University, Department of Physics, 1992 (Condensed Matter Seminar)

SPIE Conference on *Photon Migration and Imaging in Random Media and Tissues*, January 1993, Anaheim, CA (Invited Talk).

SPIE Conference on *Ultrafast Spectroscopy of Advanced Electronic and Optoelectronic Materials*, January 1993, Anaheim, CA (Invited Talk).

Du Pont Co., Wilmington, Delaware, Feb. 1993 (Seminar).

University of Pennsylvania, Department of Chemical Engineering, Feb. 1993 (Colloquium).

IBM, Yorktown Heights, NY, March 1993 (Seminar).

Engineering Foundation Conf. on Lasers in Medicine & Surgery III, Palm Coast, Florida, March 1993.

APS March Meeting, March 22-26, 1993, Seattle, WA (Invited Talk).

University of Maryland, Department of Physics, April 1993 (Colloquium).

Optical Society of America Conference on Quantum Electronics and Laser Science (QEELS '93), Baltimore, MD, May 1993 (Invited Talk).

International Spectroscopy on Luminescence and Optical Spectroscopy of Condensed Matter, August 9-13, 1993, Storrs, Connecticut (Invited Talk).

Department of Radiology, University of Pennsylvania, Sept. 20, 1993 (Seminar).

Interdisciplinary Laser Science Conference (ILS-IX), Toronto Canada, Oct. 3-8, 1993 (Invited Talk).

Healthcare Innovations in Technology Systems, (Henry Ford Health System), Atlanta, Georgia Oct. 10-13, 1993 (Invited Talk).

Materials Research Society, Fall Meeting Nov. 29 - Dec. 3, 1993, Boston, MA (Invited Talk).

SPIE Conference on *Laser Techniques for Surface Science*, Anaheim, CA, January 27-29, 1994 (Invited Talk).

University of Toronto, Department of Physics, January 31, 1994, Toronto, Canada (Seminar).

Gordon Research Conference, *Colloidal and Macromolecular Solutions*, Oxnard, CA, Feb. 1994 (Invited Talk).

American Philosophical Society, April 21-23 1994, Philadelphia, PA (Invited Talk).

Conference of Lasers and Electro Optics (CLEO'94), May 1994, Anaheim, CA (Invited Talk).

Adriatico Conference on Lasers in Surface Science, Trieste, Italy, August 1994 (Invited Talk).

American Chemical Society, *Chemical Dynamics*, Washington DC, August 1994 (Invited Talk).

Optical Society of America (ILS/OSA '94) Annual Meeting, Oct. 1994, Dallas, TX (Invited Talk).

Temple University, Department of Physics, Nov. 14, 1994 (Colloquium).

Medical Optical Imaging (MOI), Philadelphia, PA, Dec. 2, 1994 (Invited Talk).

Workshop on Advanced Materials Characterization, Univ. of PA, Nov. 1994 (Seminar).

Georgia Tech University, Department of Physics, Jan. 1995 (Colloquium).

Future Directions of Lasers in Surgery and Medicine, Salt Lake City, Utah, July 1995 (Invited Talk).

Annual Meeting of Fine Particle Society, Colloidal Interactions, Chicago, IL, August 1995 (Invited Talk).

Gordon Research Conference, *Surface Dynamics*, New Hampshire, August 1995 (Invited Talk).

Optical Society of America (ILS/OSA '95) Annual Meeting, Portland, Oregon Sept. 1995 (Invited Talk).

City College of New York (CCNY), *Conference on Interface Characterization*, New York, NY, October 1995 (Invited Talk).

General Electric Co., Schenectady, NY, December 13, 1995 (Seminar).

Rockefeller University, New York, NY, December 12, 1995 (Colloquium).

University of Pennsylvania, "Retreat on Imaging," Philadelphia, PA (Wharton-Sinkler Mansion) Dec. 19, 1995 (Invited Talk).

Mobil Corporation, New Jersey. January 9, 1996 (Seminar).

University of Virginia, Department of Physics, January 26, 1996, Charlottesville, VA (Seminar).

University of Delaware, Department of Physics, March 1996 (Seminar).

Rutgers University, Department of Physics, March, 1996, New Brunswick, NJ (Seminar).

University of Rochester, Department of Physics, Rochester, NY March 1996 (Seminar).

Case Western Reserve, Department of Physics, Cleveland, OH, April 18, 1996 (Colloquium).

Case Western Reserve, Dept. of Biophysics & Medical School, Cleveland OH, April 18, 1996 (Seminar).

Case Western Reserve, Department of Physics, Cleveland OH, April 19, 1996 (Seminar).

Radiology Grand Rounds, Univ. of PA, May 21, 1996 (Seminar/Panel Discussion).

Gordon Conference on Lasers in Biology, Meriden, New Hampshire, June 1996 (Invited Talk).

"Vibrations at Surfaces," VIII International Conf., Birmingham, UK, June 23-27, 1996 (Invited Talk).

Workshop on Rough Surface Scattering and Related Phenomena, Yountville, CA, June 24-27, 1996 (Invited Talk).

International Workshop on Nonlinear Optics of Semiconductor Surfaces, Max-Planck-Institute fuer Quantenoptic, Munich, Germany, Sept. 22-25, 1996 (Invited Talk).

Annual Meeting of European Colloid Community (ECC), Nov. 28-30, 1996, Lyon, France (Invited Talk).

University of Pennsylvania Medical School, Department of Radiation Oncology, Jan. 23, 1997 (Seminar).

Brown University, Department of Physics, Providence, RI, January 30, 1997 (Seminar).

Coherence Domain Optical Methods in Biomedical Science and Clinical Applications, SPIE/BIOS'97, San Jose, CA, Feb., 13, 1997 (Invited Talk).

Les Houches Winter School on Diffuse Waves in Complex Media, Les Houches, France, March 17-27, 1998 (3 Lectures).

APS March Meeting, Kansas City, Missouri, March 21, 1997 (Invited Talk).

University of Rochester, Institute of Optics, Rochester, NY, March 24, 1997 (Seminar).

Symposium on Soft Materials, Laboratory for Research on the Structure of Matter (LRSM), University of Pennsylvania, Philadelphia, PA, May 29, 1997 (Invited Talk).

International Conference on Breast Cancer Detection by Near Infrared Spectroscopy and Imaging, Humboldt-Universitat zu Berlin, Berlin, Germany June 6-7, 1997 (Invited Talk).

Max-Planck-Institut fuer Kolloid- and Grenzflaechenforschung (MPI-KG), Berlin, Germany, June 9, 1997 (Seminar).

71st ACS Colloid & Surface Science Symposium, University of Delaware, Newark, DE, June 29-July 2 (1997) (Keynote Lecture).

Lasers in Medicine, Engineering Foundation, Snowbird, Utah, July 13-18, 1997 (Invited talk about Group Research given by my PhD student Xingde Li).

Philadelphia College of Pharmacy and Science, Department of Mathematics, Physics & Computer Science, Philadelphia, PA, September 23, 1997 (Colloquium).

Duke University, Department of Physics, September 24, 1997, Durham, NC (Colloquium).

Interdisciplinary Laser Science Meeting (ILS-XIII), "Innovative Career Pathways in Optical Physics, PhD.....Now What?" Long Beach, CA, Oct. 12-17, 1997 (Invited Talk).

Ecole Normal Superior (ENS) de Lyon, Dept. of Physics, Lyon, France, Dec. 2, 1997 (Seminar).

Boston University, Dept. of Physics, Boston, MA, Dec. 11, 1997 (Seminar).

Winter Physics Conference, Aspen Center for Physics, Aspen, CO, January 22, 1998 (Invited Talk).

Mallinckrodt Medical, St. Louis, MO, Feb. 19, 1998 (Seminar).

APS March Meeting, Los Angeles, CA, March 1998 (Invited talk about Group Research presented by my Post-doc, John Crocker).

Harvard University, Department of Physics, Cambridge, MA, April 10, 1998 (Seminar).

Johns Hopkins University, Applied Physics Lab, April 3, 1998, Columbia, MD, (Colloquium).

Drexel University, Dept. of Biosciences & Engineering, Philadelphia, PA, April 17, 1998, (Seminar).

UC Irvine, Department of Physics, Irvine, CA, May 1, 1998 (Colloquium).

Univ. of Connecticut, Dept. of Electrical Engineering, Storrs, Conn., Dec. 11, 1998 (Colloquium).

Materials Science Summer Institute (MASSI) on Complex Fluid Materials, Joint Summer School given by Princeton/Rutgers/PENN, Georgian Court College, Lakewood, NJ, July 27-August 7, 1998 (4 Lectures).

Conference on Photon Migration in Tissues, BIOS section of the International Conference on Electro-Optics, and Optoelectronics in Europe, Stockholm, Sweden, Sept. 10, 1998 (Invited Talk).

NEC Research Institute, Princeton, NJ, Sept. 25, 1998 (Condensed Matter Physics Seminar)

Structure in Solution, Symposium sponsored by Princeton University and Rhodia Inc., Princeton, NJ, Oct. 1998 (Invited Talk).

DuPont-PENN Symposium on 'Colloidal Science', Philadelphia, PA Oct. 28, 1998 (Invited Talk).

UCSB-JNCASR-IISC Joint Workshop on Frontiers of Materials Science & Engineering, Bangalore, India, Nov. 15-20, 1998 (Invited Talk).

New York University, Physics Department, New York City, Dec. 10, 1998 (Colloquium).

Princeton University, Physics Department, Princeton, NJ, April 12, 1999 (Seminar).

University of Maryland, Chemistry Department, College Park, MD, April 14, 1999 (Seminar).

New York University, Physics Department, New York City, April 23, 1999 (Seminar).

Gordon Conference on Condensed Matter Physics, New London, CT, June 13-18, 1999 (Invited Talk).

4th Liquid Matter Conference, Granada, Spain, July 3-7, 1999 (Invited Talk).

Advances in Optics for Biotechnology, Medicine and Surgery, United Engineering Foundation Conference, Kona, Hawaii, August 1-6, 1999 (Invited Talk / Session Leader).

Symposium on Complex Fluids (Symposium for Phil Pincus), University of California at Santa Barbara (UCSB), Santa Barbara, Aug. 22-25, 1999 (Invited Talk).

International Conference on Laser Science (ILS'99), Santa Clara, CA, September 1999 (Invited Talk).

National Institutes of Health Workshop on In-Vivo Optical Imaging, Bethesda, MD, Sept. 1999 (Invited Talk).

International Symposia on Industrial Lasers and Biomedical Optics, BMO'99, Huazhong University of Science and Technology, Wuhan, China, Oct. 26, 1999 (Invited Talk).

Rice University, Dept. of Physics, Houston, Texas April 19, 2000 (Colloquium).

Rice University, Dept. of Bioengineering, Houston, Texas April 20, 2000 (Seminar).

Princeton University, Dept. of Chemical Engineering, Princeton, NJ, April 24, 2000 (Seminar).

33rd Middle Atlantic Regional Meeting of the American Chemical Society, University of Delaware, Newark, Delaware, May 15-17, 2000 (Invited Talk).

Gordon Conference on Lasers in Medicine and Biology, New London, CT, June 11-16, 2000 (Invited talk about Group Research given by my post-doc Joe Culver).

Division of Atomic, Molecular & Optical Physics, DAMOP Annual Meeting, Storrs, CT, June 14-17, 2000 (Invited Talk).

Gordon Conference on Chemistry at Interfaces, Meriden, NH, July 2-6, 2000 (Invited Talk).

5th Microgravity Fluid Physics Conference, Cleveland OH, Aug, 8-10, 2000 (Invited Talk).

Photon Correlation and Spectroscopy Topical Meeting of the Optical Society of America, Whistler, Canada, August 21-23, 2000 (Invited Talk).

Interactions, Structure, and Phase Behavior of Colloidal Dispersions, Discussion Meeting of the Royal Society, London, England, October 25-27, 2000 (Invited Talk).

The Interface between Biology and Materials Science, University of Pennsylvania, Philadelphia, PA, November 2-4, 2000 (Invited Talk).

Presentation at DARPA meeting *Optical Technologies in Biomedicine*, Washington, DC, Jan. 12, 2001 (Invited Seminar).

University of Pittsburgh, Department of Physics, Pittsburgh, PA, January 29, 2001 (Colloquium).

University of Chicago, Department of Chemistry, Chicago, IL, February 5, 2001 (Seminar).

University of Delaware, Department of Physics, Newark, DE, February 7, 2001 (Colloquium).

Johns Hopkins University, Department of Physics, Baltimore, MD, Feb. 8, 2001 (Colloquium).

Kent State University, Department of Physics, Kent, OH, Feb. 15, 2001 (Colloquium).

Federal Data Corporation, (for NASA flight), Cleveland, OH, Feb. 22, 2001 (Seminar).

Particles 2001, Orlando, Florida (Feb. 24-27, 2001) (*Plenary Lecture*).

University of Pennsylvania, Department of Bioengineering, Philadelphia, PA, March 8, 2001 (Seminar).

Ramapo College, gave *Sigma Xi Lecture*, Mahwah, NJ, March 9, 2001 (Public Lecture).

APS March Meeting, Seattle, Washington, March 12-16, 2001 (Invited talk about Group Research given by my PhD student Keng-hui Lin)

Harvard University, Department of Chemistry, Cambridge, MA, March 29, 2001 (Seminar).

Georgetown University, Department of Physics, Georgetown, DC April 5, 2001 (Colloquium)

Presentation for National Research Council Review Committee, *Colloid Science in Microgravity*, Washington, DC, April 18, 2001 (Invited Talk).

The Physics of Soft Matter, the 21st Annual Conference of the Center for Nonlinear Studies at Los Alamos Nat. Lab., Santa Fe, New Mexico, May 21-25, 2001 (Invited Talk).

Colloidal Stability and Aggregation Dynamics, American Chemical Society Colloids and Surface Symposium, Carnegie Mellon Univ., Pittsburgh, PA, June 10-13, 2001 (Keynote Lecture).

ICOLS, 15th International Conf. on Laser Spectroscopy, Snowbird, Utah, June 13-15, 2001 (Invited Talk).

University of Florence, Laser Science Institute, Florence, Italy, June 27, 2001 (Seminar).

Advancing Frontiers of Condensed Matter Physics, "Non-conventional systems and new directions," Abdus Salam International Center for Theoretical Physics, Trieste, Italy, July 2-6, 2001 (Invited Talk).

Exxon-Mobil, East Annandale, NJ, July 16, 2001 (Seminar).

Advances in Optics for Biotechnology, Medicine & Surgery, United Engineering Foundation Conf., Banff, Alberta, Canada July 22-27, 2001. (Invited talk about Group Research, given by my post-doc Joe Culver).

Colorado School of Mines, Golden, CO, Jan. 10-11, 2002 (*Heiland Lecture*).

Ohio State University, Department of Physics, Columbus, OH, Jan. 29-30, 2002 (Colloquium).

Princeton Chapter of Sigma Xi, *Sigma Xi Lecture*, Princeton, NJ, Feb. 7, 2002 (Public Lecture).

University of Pennsylvania, Department of Physics, Philadelphia, PA, Feb. 2002 (Colloquium).

APS March Meeting, Indianapolis, Indiana, March 18-22, 2002, (Invited talk about Group Research given by my PhD student Turgut Durduran).

Society of Cosmetic Chemists, Ringwood, NJ, April 1, 2002, (Seminar).

Massachusetts Institute of Technology, *Modern Optics & Spectroscopy Seminar Series*, Cambridge, MA, May 7, 2002 (Seminar).

12th International Conference on Photoacoustic and Photothermal Phenomena, Toronto, Canada, June 24 – 25, 2002 (Invited Talk).

Gordon Conference: *Granular & Granular-Fluid Flow*, Holderness School, Plymouth, NH, June 30 – July 3, 2002 (Invited Talk).

Sixth Microgravity Fluid Physics and Transport Phenomena Conference, Cleveland, Ohio, August 13 – 16, 2002 (Invited Talk).

Gordon Conference: *Lasers in Medicine & Biology*, Kimball Union Academy, (near Manchester), NH, July 14 – 17, 2002 (Invited Talk).

Soft Matters I (Joint Symposium of the LRSM and the Max Planck Institute for Colloid and Interface Science), University of Pennsylvania, Philadelphia, PA, Sept. 27, 2002 (Invited Talk).

Annual Meeting of the Optical Society of America (ILS/OSA), Orlando, FL, Oct. 2, 2002 (Invited Talk).

BioPhotonics 2002 European Workshop, Heraklion, Crete, Greece, October 16 – 21, 2002 (Invited Talk).

University of New Mexico, Dept. of Physics, Albuquerque, NM, Nov. 7, 2002 (*Sigma Xi Public Lecture*).

University of New Mexico, Dept. of Physics, Albuquerque, NM, Nov. 8, 2002 (Colloquium).

Photonics 2002, Sixth International Conference on Optoelectronics, Fiber Optics and Photonics. Mumbai, India, December 15, 2002 (Invited Talk).

Tata Institute of Fundamental Research, Mumbai, India, December 18, 2002 (Colloquium).

Indian Institute of Technology (IIT), Mumbai, India, December 19, 2002 (Seminar).

Harvard Medical School Department of Radiology and MGH/NMR Center, Cambridge, MA, January 9, 2003 (Seminar).

Haverford College, Department of Physics, Haverford, PA, March 21, 2003 (2 Lectures: Colloquium and an in-class lecture on *Biomedical Imaging*).

Soft Matters II (Joint Symposium of the LRSM and the Max Planck *Institute for Colloid and Interface Science*), Berlin, Germany, May 13, 2003 (Invited Talk).

Centre Européen de Calcul Atomique et Moléculaire (CECAM), Lyon, France, July 5-9, 2003 (Invited Talk).

Utrecht University, Departments of Chemistry and Physics, Utrecht, Netherlands, July 11, 2003 (Seminar).

Advances in Optics for Biotechnology, Medicine and Surgery, United Engineering Foundation Conference, Banff, Canada, August 2-6, 2003 (Invited overview of sub-field).

American Chemical Society (ACS) National Meeting, Colloids Section, New York, NY, Sept. 7-8, 2003 (Invited Talk).

Soft Matter Days, Kerkrade, Netherlands, November 17-21, 2003 (Invited Talk).

AstraZeneca, Wilmington, DE, January 9, 2004 (Seminar)

SPIE Meeting on Biomedical Optics, San Jose, CA, January 23-25, 2004 (Invited Talk).

Penn State, Department of Physics, State College, PA, Feb. 12, 2004 (Colloquium)

Particles 2004, Orlando, FL, March 7-8, 2004 (Invited Lecture).

Lehigh University, Department of Physics, Bethlehem, PA, April 8, 2004 (Colloquium)

Network for Optical Imaging of Breast (NTROI), UC Irvine, Irvine, CA, June 4-6, 2004 (Invited Talk).

Summer School on Colloids and Soft Materials, Eastern Michigan University, Ypsilanti, Michigan, June 16-17, 2004 (2 Lectures).

From Hard to Ultrasoft Colloids, Koutouloufari, Crete, Greece, June 22-29, 2004 (Invited Talk).

FORTH Institute at University of Crete, Iraklio, Crete, Greece, June 25, 2004 (Colloquium).

Advanced Research Technologies (ART, Inc.), Montreal, Canada, Aug. 18-19, 2004 (Seminar).

Levich Institute, City University of New York (CUNY), New York, NY, Sept. 7, 2004 (Seminar).

University of Illinois, Beckman Center, Urbana-Champaign, IL, Oct. 18, 2004 (Seminar).

University of Illinois, Department of Materials Science & Engineering, Urbana-Champaign, IL, Oct. 19, 2004 (Colloquium).

IBM, Yorktown Heights, NY, October 29, 2004 (Seminar).

Institute of Medicine and Engineering (IME), University of Pennsylvania, Philadelphia, PA, December 2, 2004 (Seminar)

Bucknell University, Department of Physics, Lewisburg, PA, Dec. 7-8, 2004 (Colloquium).

SPIE Biomedical Optics Symposium: Hot Topics Session, San Jose, CA, Jan. 22, 2005 (Invited Talk).

NIST Conference on *Nanotube Dispersions & Processing*, National Institute for Standards & Technology, Gaithersburg, MD, January 27, 2005 (Invited talk about Group Research given by my post-doc Mohammad Islam).

Avon, Suffern, NY, Feb. 8, 2005 (Seminar)

Princeton University, Department of Physics, Princeton, NJ, March 28, 2005 (Seminar).

Frontiers of Soft Condensed Matter Symposium (Symposium for Tom Lubensky & Paul Chaikin), Exxon-Mobil Research Labs, East Annandale, NJ, May 18-20, 2005 (Invited Talk).

Network for Optical Imaging of Breast (NTROI), UC Irvine, Irvine, CA, June 2-3, 2005 (Invited Talk).

79th Annual ACS Colloids and Surface Science Symposium, Clarkson University, Potsdam, NY, June 13-14, 2005 (Invited Talk).

Optical Imaging Retreat for PENN Center for Technology Transfer (CTT), Philadelphia, PA, June 29, 2005 (Invited Talk).

Applications of Optics to Biology and Medicine, Engineering Foundation Conference, Copper Mountain, CO, July 25-28, 2005 (Invited Talk).

Temple University, Department of Physics, Philadelphia, PA, Sept. 12, 2005 (Colloquium).

Rhodia, Inc., Cranbury, NJ, September 27, 2005 (Seminar).

Optics for Studies of Brain (Symposium), Bad Honnef, Germany, Oct. 31-Nov.4, 2005 (Invited Talk).

University of Delaware, Department of Chemical Engineering, Newark, Delaware, Nov. 22, 2005 (Seminar).

Symposium on Statistical Physics (Annual meeting), Rutgers University, New Brunswick, NJ, December 19-20, 2005 (Invited Talk).

International Winter School on Applications of Modern Optics to Condensed Matter Sciences, Chinese Academy of Sciences, Beijing, China January 5-9, 2006 (2 Lectures).

OSA Biomedical Optics Topical Meeting, Fort Lauderdale, Florida, March 19-22 2006 (Invited Talk).

OSA Topical Meeting *Photonic Metamaterials: From Random to Periodic*, Freeport, Bahamas, June 5-7 2006 (Invited Talk).

Network for Optical Imaging of Breast (NTROI), UC Irvine, Irvine, CA, June 22-23, 2006 (Invited talks about Group Research (3) from my PhD/Post-doc group members, R. Choe, S. Konecky, K. Lee).

21st International Liquid Crystal Conference, Keystone, Colorado, July 2-7, 2006 (Invited Talk).

Gordon Research Conference on Physical Metallurgy, Holderness School, Plymouth, NH, July 23-28, 2006 (Invited Talk).

World Congress on Medical Physics & Bioengineering, Seoul, Korea, August 27-Sept. 1, 2005 (2 Talks: Invited talk and Tutorial Lecture about Diffuse Optics).

American Chemical Society (ACS) National Annual Meeting, San Francisco, CA. Sept. 10-14, 2006 (*Langmuir Lecture*).

Symposium on Formulation of Soft Matter, Rhodia Inc., Bristol, PA, Nov. 13, 2006 (Invited Talk).

University of Pennsylvania Medical School (HUP), Department of Physical Medicine and Rehabilitation, Philadelphia, PA, December 19, 2006 (Seminar).

Joint Symposium on Frontier Materials Research, Academia Sinica/LRSM-MRSEC, Taipei, Taiwan, January 4-10, 2007 (Invited Talk).

Wayne State University, Department of Physics, Detroit, MI, January 24-25, 2007 (Colloquium).

Rutgers University, Department of Mechanical Engineering & Applied Mechanics (MEAM), New Brunswick, NJ, February 7, 2007 (Seminar).

Duke University, Department of Physics, Durham, NC, April 8-10, 2007 (Colloquium).

University of Massachusetts at Amherst, Department of Polymer Science, Amherst, MA, April 12-14, 2007 (Colloquium).

MGH/MIT Lester Wolfe Workshop on Biomedical Optics, Massachusetts General Hospital (MGH), Boston, MA, April 17-18, 2007 (Invited Talk).

Annual Meeting of the American Colleges of Sports Medicine, New Orleans, LA, May 30 to June 1, 2007 (Invited Talk).

Gordon Research Conference on Liquid Crystals, New London, New Hampshire, June 10-12, 2007 (Invited Talk).

ACS 81st Annual Conference on Surfaces and Colloid Science, University of Delaware, Newark, Delaware, June 25-27, 2007 (Invited talks about Group Research (2) given by my Post-docs, Y. Han, A. Alsayed).

Network for Optical Imaging of Breast (NTROI), UC Irvine, Irvine, CA, June 28-30, 2007 (Invited talk about Group Research given by my Post-doc, R. Choe).

Conference on Correlated Systems in Applied Physics, University of Tokyo, Tokyo, Japan, September 25-30, 2007 (Invited Talk).

Vanderbilt University, Department of Physics, Nashville, Tennessee, Nov. 8, 2007 (Colloquium).

Harvard University, Department of Physics, Cambridge, MA, Nov. 30, 2007 (Seminar).

University of Chicago, Department of Physics, Chicago, Illinois, January 31, 2008 (Colloquium).

Johns Hopkins University, Department of Chemical & Biomolecular Engineering, Baltimore, Maryland, February 20, 2008 (Seminar)

ACC Radiation Biology Program Research Meeting, 196 John Morgan Building, School of Medicine, University of Pennsylvania, Philadelphia, PA, April 3, 2008 (Seminar).

SPIE Conference on Optical Trapping and Optical Micromanipulation, San Diego, CA, August 8-10, 2008 (Invited Talk).

Engineering in Medicine & Biology-LEOS Symposium on Biomedical Optics, Vancouver, Canada, August 20-21, 2008 (Invited Talk).

University of Washington, Department of Chemistry, Seattle, WA, October 7-9, 2008 (Colloquium).

Oregon Health Sciences University, Portland, Oregon, October 9-11, 2008 (Seminar).

Department of Physics, Emory University, Atlanta, GA, October 24, 2008 (Colloquium).

Bi-annual Southeastern US Complex Fluids Meeting, Atlanta, GA, October 25, 2008 (Invited Talk).

International Conference on Lasers in Life Sciences, Taipei, Taiwan, December 3-6, 2008 (Invited Talk).

Yangming University, Dept. of Neuroscience, Taipei, Taiwan, December 5, 2008 (Seminar).

Academia Sinica, Physics Division, Taipei, Taiwan, December 8, 2008 (Seminar)

Hong Kong University of Science & Technology (HKUST), Physics Department, Hong Kong, December 11, 2008 (Seminar).

Beckman Laser Center, Bioengineering/Medical School, UC Irvine, Irvine, CA, Jan. 23, 2009 (Seminar).

Biophotonics/SPIE BiOS: "Hot Topics," San Jose, CA, January 25 – 26, 2009 (Invited Talk).

Ringberg Castle Soft Matter Conference, Krueth, Germany, March 7-10, 2009 (Invited Talk).

University of Stuttgart, Department of Physics, Stuttgart, Germany, March 11, 2009 (Seminar).

APS March Meeting, Pittsburgh, PA, March 18 – 19, 2009 (Invited Talk).

University of Minnesota, Department of Chemical Engineering, Minneapolis, MN, March 30-31, 2009 (Seminar).

Cornell University, Department of Physics, Ithaca, NY, April 19-21, 2009 (Colloquium).

Presented *Lectures on Diffuse Optics: Fundamentals & Tissue Applications*, CLXXIII International School of Physics "Enrico Fermi", Varenna, Italy, June 26 - July 3, 2009. (2 Lectures)

Presented *Lectures and Experiments at Hands-On Research in Complex Systems School*, Universidade Federal do ABC, Santo André, Sao Paulo, Brasil, July 28 to August 7, 2009 (Invited Talk / Lab Course).

EMBC-IEEE Conference on Biomedical Engineering, Minneapolis, MN, Sept. 3-4, 2009 (Invited Talk).

Rochester Institute of Technology and University of Rochester (Joint), Departments of Physics, Rochester, NY, December 10-11, 2009 (Seminar).

ICFO (Institute of Photonics Sciences), Barcelona, Spain, January 9, 2010 (Colloquium)

ICFO (Institute of Photonics Sciences), Barcelona, Spain, January 10, 2010 (Seminar)

University of Barcelona, Department of Physics, Barcelona, Spain, January 11, 2010 (Seminar)

University of Texas, Biomedical Engineering Department, Austin, Texas, Feb. 11, 2010 (Colloquium)

APS March Meeting, Portland, Oregon, March 15-18, 2009 (Invited talk about Group Research given by my Post-doc Zexin Zhang).

1st COMPASS Symposium of the LRSM-Rhodia-CNRS Soft Matter Collaboration, University of Pennsylvania, Philadelphia, PA, April 29, 2010 (Invited Talk).

Fourth annual PREM Symposium: Soft Matters, University of Puerto Rico at Humacao, Puerto Rico, May 5-9, 2010 (Invited Talk / Session Chair).

Conference on Lasers and Electro-Optics (CLEO) 2010, San Jose, CA, May 17-18, 2010 (Invited Talk).

Mid-Atlantic Soft Matter Workshop (MASM), Georgetown University, Washington DC, June 17-18, 2010 (Invited Talk).

2nd Annual Bragg-Stoner Symposium "Understanding Frustrated Interactions Using Nanotechnology," University of Leeds, Leeds, UK, July 10-15, 2010 (Invited Talk).

Center of Integrated Nanotechnologies (CINT) User Conference, Joint Los Alamos National Lab & Sandia National Lab Sponsorship, Albuquerque, NM, August 10-11, 2010 (Invited Talk).

North American Thermal Analysis Society (NATAS), University of Pennsylvania, Philadelphia, PA, August 17-18, 2010 (*Plenary Lecture*).

1st fNIRS (Functional Near-Infrared Spectroscopy) of Brain Workshop, Harvard University, Cambridge, MA, October 15-17, 2010 (Invited Talk).

Advances in Breast Cancer Research Workshop, University of Arkansas, Fayetteville, Arkansas, October 26-28, 2010 (Invited Talk).

Royal Society Theo Murphy meeting on Biomedical Optics, The Kavli Royal Society International Center, London UK, November 6-10, 2010 (Invited Talk).

University of Pennsylvania, Department of Radiology, Philadelphia, PA, January 18, 2011 (Seminar).

Photonics West, SPIE Hot Topics Session, "Britton Chance Retrospective", San Francisco, CA, January 22-27, 2011 (Invited Talk).

University of Illinois, Department of Electrical and Computer Engineering (ECE), Urbana-Champaign, IL, February 17, 2011 (Colloquium).

University of Pennsylvania, Department of Radiology Grand Rounds, Philadelphia, PA, February 22, 2011 (Seminar).

National Science Foundation (NSF) Partnership for Research and Education in Materials (PREM) and MRSEC Joint Directors Meeting, Puerto Rico, March 9-11, 2011 (Invited talk).

APS March Meeting, Dallas, TX, March 21-25, 2011 (Invited talk presented by my Post-doc Ke Chen).

American Chemical Society, Symposium on "Dynamics of Colloid Dispersions," Anaheim, CA, March 28, 2011 (Invited talk about Group Research presented by my PhD student Peter Yunker).

LRSM Science Café Program 2010/2011, Stoney's, Wilmington, DE, April 25, 2011 (Public Lecture).

Symposium: Britton Chance: His Life, Times, & Legacy, Fisher Translational Research Center, University of Pennsylvania, Philadelphia, PA, June 3, 2011 (Invited Talk).

NIH Bench to Bed-Side meeting, National Institutes of Health, Bethesda, MD, September 14-15, 2011 (Invited Talk).

Soft Matter & Innovation (Symposium for Dave Weitz), Harvard University, Cambridge, MA, October 8-10, 2011 (Invited Talk).

State University of New York at Stony Brook, Department of Biomedical Engineering, NY, October 19, 2011 (Seminar).

Diffuse Optical Imaging Workshop, Rensselaer Polytechnic Institute, Troy, NY, October 27-28, 2011.

Chang Gung University (CGU) and Chang Gung Memorial Hospital (CGMH) Joint-sponsorship, Taoyuan, Taiwan, November 2, 2011 (Colloquium).

Yang Ming University, Taipei, Taiwan, November 3, 2011 (Seminar).

Stanford University, Department of Bioengineering, Palo Alto, CA, December 6, 2011 (Seminar).

National Institute of Materials Science (NIMS), Tsukuba, Japan, Dec. 21, 2011 (Seminar).

University of North Carolina, Department of Physics, Chapel Hill, NC, January 9, 2012 (Colloquium).

ACC Breast Cancer Program Scientific Retreat, Hospital at the University of Pennsylvania, Philadelphia, PA, January 27, 2012 (Seminar).

LRSM Science Café 2011-12, Dark Horse Pub, Philadelphia, PA, February 6, 2012 (Public Lecture).

University of Massachusetts at Amherst, Dept. of Physics, Amherst, MA, Feb. 8, 2012 (Colloquium).

Bi-Annual Conference of Peace through Mind-Brain Research, Hammamatsu, Japan, February 15, 2012 (Invited Talk).

APS March Meeting, Boston, MA, February 28, 2012 (Invited Talk).

APS March Meeting, Boston, MA, March 2, 2012 (Invited talk presented by my PhD student Peter Yunker).

University of Southern California (USC), Department of Physics, Los Angeles, CA, April 6, 2012 (*Distinguished Lecture*).

ACC Program in Radiology and Imaging Lecture Series, Hospital at the University of Pennsylvania (HUP), Philadelphia, PA, April 26, 2012 (Seminar).

Frontiers of Soft Matter 2012 Symposium (Symposium for Noel Clark), University of Colorado, Boulder CO, May 16-18, 2012 (Invited Talk).

COMPLOIDs Annual Meeting 2012, University of Edinburgh, Edinburgh, UK, May 29-June 2, 2012 (Invited Talk).

Biomedical Imaging Retreat 2012, Hospital at the University of Pennsylvania (HUP), University of Pennsylvania, Philadelphia, PA, June 7, 2012 (Invited Talk).

86th Annual ACS Colloid & Surface Chemistry Symposium, Johns Hopkins, Baltimore, MD, June 11-12, 2012 (*Plenary Lecture*).

École Supérieure de Physique et de Chimie Industrielles (ESPCI), CNRS Gulliver Seminar, Paris, France, June 25, 2012 (Seminar).

Lecturer at the *International "Enrico Fermi" International School of Physics, Physics of Complex Colloids 2012*, Varenna, Italy, July 7, 2012 (Invited Lectures).

American Chemical Society National Meeting, Philadelphia, Marriott, Franklin Hall, Philadelphia, PA, August 21, 2012 (Invited Talk).

Rensselaer Polytechnic Institute (RPI), Department of Chemical Engineering, Albany, NY, September 11-12, 2012 (Colloquium).

University of Akron, Polymer Science Institute, Akron, OH, Sept. 20-21, 2012 (Colloquium).

Tufts University, Department of Physics, Medford, MA, October 4-5, 2012 (Colloquium).

University of Ljubljana, Department of Electrical Engineering, Ljubljana, Slovenia, October 10, 2012 (Seminar).

Workshop on Assembling of Superstructures in Soft Matter, Ljubljana, Slovenia, October 11-14, 2012 (Invited Talk).

Workshop on Fluidity, Rigidity, Adaptability Frontiers, University of Chicago, Chicago, IL, October 26-28, 2012 (Invited Talk).

Brain Behavior Lab, Hospital at the University of Pennsylvania (HUP), Dept. of Neuropsychology, Philadelphia, PA, December 6, 2012 (Seminar).

Rowan University, Department of Physics, Glassboro, NJ, February 22, 2013 (Colloquium)

Lester-Wolfe Workshop *Light in the Brain: Neurodegeneration & Neuroprotection*, sponsored by MIT and the Wellman Laser Labs, Wellman Conference Center, Cambridge, MA, April 30-May 1, 2013 (Invited Talk).

Chance 100th Symposium on Metabolic Imaging and Spectroscopy, University of Pennsylvania, Philadelphia, PA, June 18-19, 2013 (Invited Talk).

ETH University, Zurich, Switzerland, June 26, 2013 (Seminar).

CECAM Meeting on Glasses, CECAM-ETHZ, Honggerberg Campus, Zurich, Switzerland, June 26-27, 2013 (Invited Talk).

Evolution of Colloidal Matter (Symposium for David Pine), Center for Genomics and Systems Biology, New York University, New York City, NY, June 27-29, 2013.

University of Bordeaux, Centre de Recherche Paul-Pascal, Bordeaux, France, July 2-7, 2013 (Colloquium).

Institute of Physics of UNICAMP (Campus Universitario Zeferino Vaz SN - Cidade Universitaria), Campinas, Sao Paulo, Brazil, July 15, 2013 (Colloquium).

IFGW Winter School, Institute of Physics of UNICAMP (Campus Universitario Zeferino Vaz SN - Cidade Universitaria), Campinas, Sao Paulo, Brazil, July 14-19, 2013 (2 Winter School Lectures).

7th International Discussion Meeting in Complex Systems (IDMCS), Universitat Politècnica de Catalunya, Barcelona, Spain, July 21-26, 2013.

SPIE, OTOMX: Optical Trapping & Optical Micromanipulation, SPIE Optics + Photonics 2013, San Diego, CA, August 25-29, 2013.

ACS 246th National Meeting, Convention Center, Indianapolis, IN, September 8-12, 2013.

133rd ICB Seminar on *Optoelectronics in Medical Diagnosis (Optics for Brain Symposium) at International Centre of Bio-cybernetics (ICB)*, Warsaw, Poland. September 25-29, 2013.

Photonics Workshop, ABEC – Australian Biomedical Engineering Conference, Sydney, Australia, October 14, 2013.

University of Sydney, School of Chemistry, Sydney, Australia, October 15, 2013 (Seminar).

University of Sydney, School of Electrical & Information Engineering, Sydney, Australia, October 16, 2013 (Seminar).

Complex Fluids 4, American Society for Gravitational and Space Research (ASGSR)/ International Symposium for Physical Sciences in Space (ISPS), Orlando, FL, Nov. 7-8, 2013.

Los Alamos National Laboratory, Los Alamos, NM, January 5-8, 2014 (Seminar).

Georgia Tech, *Squishy Physics Saturday*, Atlanta, GA, March 21-23, 2014 (*Public Lecture on the Physics of Chocolate*).

8th *Annual Symposium on NSF-PREM-related Research*, University of Puerto Rico, Humacao, Puerto Rico, May 15 – 16, 2014 (Invited speaker/chair).

International Workshop on Tissue Phantoms and Standardization in Biophotonics, University of Maryland, College Park, MD, May 20-21, 2014 (Invited Talk).

Penn Outreach Nano-Media Event, Univ. of Penn Club, New York, NY, June 6, 2014 (Invited Talk).

International Society on Oxygen Transport to Tissue (ISOTT) Annual Meeting, University College London, London, UK, June 27 to July 3, 2014 (Invited Talk).

9th Liquid Matter Conference, Univ. of Lisbon, Lisbon, Portugal, July 19-26, 2014 (Keynote Lecture).

Chinese Academy of Sciences, Beijing, China, Sept. 1, 2014 (Seminar).

Beijing University (PKU), Department of Physics, Beijing, China, Sept. 2, 2014 (Seminar).

Chinese Academy of Applied Physics, Mianyang, China, Sept. 4, 2014 (2 Seminars).

Huazhong University of Science & Technology, Wuhan, China, Sept. 9, 2014 (Colloquium).

Soochow University, Department of Physics, Suzhou, China, Sept. 12, 2014 (Seminar).

Kent State University, Department of Physics, Kent, OH, October 15-16, 2014 (Colloquium).

CECAM Workshop “Friction & Interface Dynamics at Nano- and Meso-scales,” Tel Aviv University, Tel Aviv, Israel, October 25-30, 2014 (Invited Talk).

Bar-Ilan University, Department of Physics, greater Tel Aviv area, Israel, Oct. 29, 2014 (Seminar).

University of Colorado, Department of Physics, Boulder, CO, December 10, 2014 (Colloquium).

University of Colorado, Department of Physics, Boulder, CO, December 11, 2014 (Seminar).

45th *Winter Colloquium on Physics of Quantum Electronics*, Snowbird, Utah, January 4-8, 2015 (Invited Talk).

11th *IGAKUKEN International Symposium on Advances in Biomedical Imaging*, Tokyo Metropolitan Institute of Medical Science, Tokyo, Japan, Feb. 17-21, 2015 (Invited Talk).

Physics of Structural and Dynamical Hierarchy in Soft Matter (Symposium for Hajime Tanaka), University of Tokyo, Tokyo, Japan, March 14-18, 2015 (Invited Talk).

International Society of Oxygen Transport in Tissue (ISOTT) Annual Meeting 2015, Wuhan, China (July 9-16, 2015 (Invited Talk/Session Chair).

Hong Kong University of Science and Technology (HKUST), Dept. of Physics, Hong Kong, China, July 20-21, 2015 (Colloquium).

University of Hong Kong, Department of Mechanical Engineering, Hong Kong, China, July 22, 2015 (Seminar).

Chinese University of Hong Kong, Dept. of Physics, Hong Kong, China, July 23-24, 2015 (Colloquium).

Massachusetts Institute of Technology, Department of Materials Science, Cambridge, MA, Sept. 11, 2015 (Seminar).

Yale University, Department of Applied Physics, New Haven, Connecticut, Sept. 23-24, 2015 (Seminar).

The Franklin Institute, *Public Lecture* on “*Why Light Matters*,” Philadelphia, PA, October 17, 2015 (Public Lecture).

Mid-Atlantic Chapter of the American Physical Society (APS) Fall Meeting, Morgantown, West Virginia, October 23-24, 2015 (Invited Talk).

University of California at Irvine, Department of Physics, Irvine, CA, October 28-31, 2015 (Colloquium).

Jülich Soft Matter Days 2015, Bad Honnef, Germany, November 9-13, 2015.

University of Copenhagen, Department of Neurology, Copenhagen, Denmark Nov. 17, 2015 (Seminar).

Korean Advanced Institute of Science and Technology (KAIST), Department of Biomedical Optics, Daejeon, South Korea, December 8-9, 2015 (Seminar).

Korean Advanced Institute of Science and Technology (KAIST), Department of Physics, Daejeon, South Korea, December 8-9, 2015 (Seminar).

Korean Institute for Science & Technology (KIST), Seoul, South Korea, Dec. 10-11, 2015 (Seminar).

19th Innovative Workshop on Soft/Bio Materials 2015, Ulsan National Institute of Science and Technology (UNIST), Ulsan, South Korea, December 11-12, 2015.

Daegu Gyeongbuk Institute of Science and Technology (DGIST), Department of Biomedical Engineering, Daegu, South Korea, December 14, 2015 (Seminar).

Solvay Inc., Research Headquarters in Seoul (at Ewha Univ.), South Korea, Dec. 15, 2015 (Seminar).

Samsung, Electronics Mobile Communication, Seoul/Suwon, South Korea, Dec. 16, 2015 (Seminar).

COMPFLU 2016, Indian Institute of Science Education and Research, Pune (IISER-Pune), Pune, India, January 2-4, 2016 (Invited Talk).

Discussion Meeting on Emergent Phenomena in Soft and Active Matter, International Centre for Materials Science, Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), Bangalore, India, January 6, 2015 (Keynote Lecture).

Saint Joseph’s University, *McGroddy Lecture for Departments of Physics, Chemistry and Biology*, Philadelphia, PA, February 3, 2016 (McGroddy Lecture).

Tel Aviv University, *Sackler Lecture 1* (Host: Department Biomedical Engineering), Tel Aviv, Israel, March 6, 2016 (Sackler Lecture).

Tel Aviv University, *Sackler Lecture 2* (Host: Department of Physics), Tel Aviv, Israel, March 10, 2016, (Sackler Lecture).

Beijing University (PKU), *PKU-Penn Joint Symposium on Molecular Science Frontiers*, Beijing, China, July 11-13, 2016 (Overview and Invited Talk).

Penn Wharton China Center, *Public Lecture* entitled “*Penn Science for Building a New World: Materials & Optics @ the Research Frontier*,” Beijing, China, July 14, 2016 (Public Lecture).

Heinrich-Heine-University of Dusseldorf, Dusseldorf, Department of Physics, Germany, July 28, 2016 (Seminar-*Soft Solids*).

Heinrich-Heine-University of Dusseldorf, Department of Physics, Dusseldorf, Germany, July 29, 2016 (Seminar-*Coffee Stains*).

University of Massachusetts, Amherst, *Workshop on Surface Activity Driven by Material Geometry and Elasticity*, September 8-10, 2016 (Invited Talk).

Universitätsklinikum of Dusseldorf, Department of Neuroradiology, Dusseldorf, Germany, September 12, 2016 (Seminar-*Functional Imaging and Monitoring with Light*).

International Conference on Innovative Optical Health Science, Shanghai, China, October 10-12, 2016 (Plenary Lecture).

University of California at Riverside, Department of Bioengineering, *2016-17 Distinguished Speaker Series*, Riverside, CA, January 25, 2017 (Colloquium).

Stockton University, Department of Physics, Galloway, NJ, February 6, 2017 (Colloquium).

37th CNLS Annual Conference - Applied Statistical Mechanics, Santa Fe, NM, May 1-4, 2017 (Invited Talk)

Institut Fresnel, Aix-Marseille Universite, Marseille, France, June 2, 2017 (Seminar).

Biomedical Optics and its Challenges 2017, CERIMED, Campus of La Timone Hospital, Marseille, France, June 6-8, 2017 (Invited Talk).

The Broad Reach of Materials Physics, Symposium Marking the Retirement of Peter Collings, Swarthmore College, Swarthmore, PA, June 10, 2017 (Invited Talk).

ECI Advances in Optics for Biotechnology, Medicine and Surgery XV, Snowmass Village, CO, July 23-26, 2017 (Invited Talk covering Group Research, given by my post-doc Ashwin Parthasarathy).

PBIM 2017 – 14th International Conference on Photonics and Imaging in Medicine and Biology, Suzhou, China, September 26-28, 2017 (Plenary Lecture).

Mexican Symposium on NIRS Neuroimaging (MEXNIRS), Instituto Nacional de Astrofísica Óptica y Electrónica – INAOE, San Andrés Cholula, Puebla, Mexico, October 20-21, 2017 (Keynote Lecture).

Lehigh University, Department of Bioengineering, Bethlehem, PA, November 8, 2017 (Seminar).

Lehigh University, Department of Physics, Bethlehem, PA, November 9, 2017 (Colloquium).

Massachusetts Institute of Technology (MIT), Department of Mechanical Engineering, Cambridge, MA, December 12, 2017 (Seminar).

NSF Shared Facilities Operations Workshop 2018, University of California at Santa Barbara (UCSB), Santa Barbara, CA, March 9-10, 2018 (Invited Talk).

OSA Biophotonics Congress: Biomedical Optics, Hollywood, FL, April 3-6, 2018 (Plenary Lecture).

Soft Matter Frontiers Symposium, Georgia Tech University, Atlanta, GA, April 18-20, 2018 (Invited).

Optics in Neuromonitoring, Symposium sponsored by *EU BitMap* (Brain Injury and Trauma Monitoring using Advanced Photonics) Consortium, Nalecz Institute of Biocybernetics and

Biomedical Engineering, Polish Academy of Sciences, Warsaw, Poland, May 28-30, 2018
(Invited).

Designer Soft Matter 2018, Singapore, June 6-8, 2018 (Invited).

Technical University of Munich, *Center for Translational Cancer Research (TranslaTUM)*,
Munich, Germany, July 16, 2018 (Seminar).

Pearl River Workshop of Biophotonics 2018, Jinan University, Guangzhou, China, July 27, 2018
(Plenary Lecture).

Pacific Rim Conference on Lasers and ElectroOptics (CLEO Pacific Rim) 2018, Hong Kong,
China, July 29 – August 3, 2018, (Tutorial Speaker).

University College London (UCL), Department of Medical Physics & Biomedical Engineering
and Centre for Medical Image Computing, London, UK, August 10, 2018 (Seminar).

University of Toronto, Department of Medical Biophysics, Toronto, Canada, September 10,
2018 (Seminar).

University of Tokyo, Institute of Industrial Science, Tokyo, Japan, October 5, 2018 (Seminar).

fNIRS 2018, Biannual meeting of the Society of Functional Near-Infrared Spectroscopy, Tokyo,
Japan, October 5-8, 2018 (Invited).

Nonequilibrium Collective Dynamics: Bridging the Gap between Hard and Soft Materials,
International Conference NECD18, Potsdam, Germany, October 8-11, 2018 (Invited).

Science Café, Stoney's British Pub, Wilmington, DE, October 15, 2018 (LRSM-MRSEC Public
Lecture).

Nanyang Technological University (NTU), Biomedical Engineering Faculty, Singapore,
November 16, 2018 (Seminar).

Nanyang Technological University (NTU), College of Engineering (CoE) *Distinguished Lecture*,
Singapore, November 19, 2018.

University of Chicago, James Frank Institute (Departments of Physics, Chemistry), Chicago,
Illinois, February 26, 2019 (Seminar)

Sao Paulo School of Advanced Science on Modern Topics in Biophotonics, Sao Carlos, Brazil,
March 20-29, 2019 (School Lecturer, 3 lectures during 3/20-3/25).

Facebook Inc., *Brain-Computer Interface Webinar Series*, hosted at Menlo Park, CA, May 6,
2019 (Seminar).

Quantitative Diffuse Optical Methods for Neuromonitoring, Symposium sponsored by Nalecz
Institute of Biocybernetics and Biomedical Engineering, Polish Academy of Sciences (IBIB
PAN), Warsaw, Poland, June 17-19, 2019 (Invited Talk).

ICFO – The Institute for Photonic Sciences, Av. Carl Friedrich Gauss 3, Castelldefels,
Barcelona, Spain, June 21, 2019 (Seminar).

Nano Korea 2019, KINTEX, Korea, July 3-5, 2019 (Plenary Lecture).

Yonsei University, Seoul, Korea, July 5, 2019 (Seminar).

Gordon Research Conference (Liquid Crystals), Colby-Sawyer College, New London, NH, July
7-12, 2019 (Invited Talk).

Topical Problems of Biophotonics (VII International Symposium), Nizhny Novgorod, Russia,
July 27-31, 2019 (Plenary Lecture).

University of Pittsburgh, Swanson School of Engineering (Industrial Engineering), Pittsburgh, PA, September 5, 2019 (Seminar).

Functional Near-Infrared Spectroscopy UK 2019 (fNIRS UK), University of Birmingham, Birmingham, UK, September 24-25, 2019 (Plenary Lecture).

Miami University of Ohio, Department of Physics, Oxford, Ohio, October 9, 2019 (Colloquium).

City College of New York (CCNY-CUNY), Department of Physics, New York, NY, October 23, 2019 (Colloquium).

Virginia Tech, Department of Physics, Blacksburg, VA, November 15, 2019 (Colloquium).

Biophotonics and Imaging Graduate Summer School (BIGSS) 2020, National University of Ireland, Galway, Ireland, August 25-29, 2020 (4 Lectures at the Virtual Summer School).

Indian Institute of Technology (IIT), Delhi, Department of Physics, Delhi, India, April 19, 2021 (Colloquium).

47th Annual NATAS Conference (Virtual), North American Thermal Analysis Society (NATAS), Philadelphia, PA, August 6, 2021 (Plenary Speaker).

Center for Advance Metabolic Imaging and Precision Medicine, Perleman School of Medicine, University of Pennsylvania, February 17, 2022 (Seminar).

Raman Research Institute, Bangalore, India, March 31, 2022 (Colloquium).

Louisiana State University (LSU), Cain Department of Chemical Engineering, Baton Rouge, LA, April 29, 2022 (Colloquium).

Drops, Particles and Bugs, Science, Startups and Success: Workshop to celebrate Jerome Bibette, Benasque, Spain, May 31 – June 4, 2022 (Invited Talk).

The Institute for Photonic Sciences (ICFO), Av. Carl Friedrich Gauss 3, Castelldefels, Barcelona, Spain, October 18, 2022 (Seminar).

The Institute for Photonic Sciences (ICFO), Av. Carl Friedrich Gauss 3, Castelldefels, Barcelona, Spain, October 18, 2022 (Public Lecture, Physics of Chocolate).

Physics in Medicine and Biology 2022, XXXVII Trobades Científiques de la Mediterrània – Josep Miquel Vidal, Mao, Menorca, Spain October 19-21, 2022 (Invited Talk).

Gordon Research Conference (Colloidal, Macromolecular and Polyelectrolyte Solutions), Ventura, CA, November 6-11, 2022 (Invited Talk).

Webinar Series (sponsored by the *SPIE* and *Journal of Biomedical Optics*) entitled “50 Years After Pulse Oximetry Was Invented,” December 12, 2022 (Invited Talk & Panel Discussion).

Bi-Annual (19th) Conference on Peace through Mind-Brain Research, Hamamatsu, Japan, February 20-23, 2023 (Invited Talk).

Multimodal Imaging of Ketone Body Metabolism in Health and Disease, Center for Advanced Metabolic Imaging and Precision Medicine (CAMIPM) 2023 Workshop, Perelman School of Medicine, University of Pennsylvania, Philadelphia, PA, March 16, 2023 (Invited Talk).

Science Café, Stoney’s British Pub, Wilmington, DE, March 28, 2023 (LRSM-MRSEC Public Lecture).

MPAF@60(1 + ε), *Symposium to honor of Mathew Fisher*, May 19-20, 2023, University of California at Santa Barbara (UCSB), Santa Barbara, CA (short Invited Talk).

Lasers, Optics, Photonics, Sensors, Biophotonics, & Ultrafast Nonlinear Optics (LOPS 2023), June 2-5, 2023, Fort Lauderdale, FL (Invited Talk).

NCIBT - Interventional Biophotonics Week Symposium and Summer School, July 17-21, 2023, University of California at Davis, Davis, CA (Invited Talk).

Center for Precision Surgery Seminar Series of the Abramson Cancer Center, Perleman School of Medicine, PCAM Room 14-101, University of Pennsylvania, Philadelphia, PA, March 7, 2024 (Seminar).

New York University (NYU), Department of Physics, New York, NY, March 28, 2024 (Colloquium).

LOPS 2024: Lasers, Optics, Photonics, Sensors, Biophotonics, & Ultrafast Nonlinear Optics, June 6-9, 2024, Hollywood, FL (Invited Talk).

Photonics Media (Biophotonics publisher) Webinar, presented June 25, 2024, recording available online (Invited Talk).

The Third Britton Chance International Symposium on Metabolic Imaging and Spectroscopy, University of Pennsylvania, Perelman School of Medicine, Philadelphia, PA, July 17-20, 2024 (Invited Talk).

NCIBT – Second Interventional Biophotonics Week Symposium and Summer School, July 21-25, 2024, University of California at Davis, Davis, CA (Invited Talk on Panel).

American Chemical Society (ACS Fall Meeting), Denver, Colorado, August 18-22, 2024 (Invited Talk).

MAJOR RESEARCH GRANTS

[>\$80M generated from primary efforts (PI/Co-I)]

Petroleum Research Fund, American Chemical Society (1990-1992, Yodh (PI))

PRF 22328-GS

“Nonlinear Optical Studies of Ultra-thin Silicide Films on Silicon”
(\$18K Total)

National Science Foundation (1990-1996, Yodh (PI))

NSF DMR-9058498

“Presidential Young Investigator”

(\$500K Total; \$100K/year with matching funds, for 5 years)

National Science Foundation (“Materials Research Center Grants: MRL & MRSEC”, 1988-present)

NSF DMR-8519059; NSF DMR-8819885; NSF DMR-9120668; NSF DMR-9632598; NSF DMR-0079909; NSF DMR-0520020; NSF DMR11-2090; NSF DMR-1720530

Continuous funding for many different interdisciplinary collaborative research projects; I was a group leader for some of these collaborative projects.

(\$35K/year 1988-91, \$60K/year 1992-96, \$75-80K/year 1996-2017, \$150K/year 2017-2023; Yodh was MRSEC Co-PI for 2004-09 and MRSEC PI for 2009-17, 2017-23)

National Science Foundation (1990-1993, Yodh (PI))

NSF DMR-9003687

“Diffusing-Wave Spectroscopy & its Applications to Dynamical Studies of Dense Colloidal Suspensions”
(\$120K Total; \$40K/year)

Office of Naval Research (1991-1997, Yodh (PI))

ONR N00014-91-J-1867

“Second-Order Nonlinear Optical Spectroscopy of Solid-Solid Interfaces”
(\$600K Total; \$100K/year)

Alfred P. Sloan Foundation (1991-1995)

“Sloan Fellowship”

(\$30K)

National Science Foundation (1993-1997, Yodh (PI))

NSF DMR-9306814

“Applications of Diffusing Light Spectroscopies for Study of Dense Random Media”
(\$180K Total; \$60K/year)

Mallinckrodt, Inc. (1994-1998, Yodh (PI))

“Contrast Agents for Detection of Tumors Using Diffusing Near-Infrared Light Probes”
(~\$350K Total; \$75K-\$100K/year)

NIM Incorporated, (1995-1997, NIH SBIR Phase II subcontract; Yodh (Co-I))

NIH (NINDS) N44-NS-5-2317

“Regional Brain Imager”

(~\$120K Total; ~\$40K/year)

National Science Foundation (1996-1999, Yodh (PI))

NSF DMR-9623441

“Diffusion of Particles and Photons in Complex Fluids”
(\$240K Total; \$80K/year)

National Science Foundation (1997-2000, Yodh (PI))

NSF DMR-9701657

“Three-Wave Mixing Spectroscopy of Buried Solid Interfaces and Thin Film Structures”
(\$210K Total; 70K/year)

National Institutes of Health (1997-2000, Yodh (PI))

NIH 1R01-CA075124-01

“FFT-Based Images with Diffusing Light Waves”

(~\$1.2M Total; ~\$400K/year)

National Science Foundation (1997, Klein, PI; Yodh, Co-PI & Shared Experimental Facility Director)

NSF DMR-9724486

“Acquisition of Instrumentation of Imaging and Micromanipulation of Soft Materials”

(~\$200K Total)

National Aeronautics and Space Administration, NASA (1998-2003, Yodh (PI))

NASA NAG3-2172

“Colloidal Assembly in Entropically Driven, Low-Volume-Fraction Binary Particle Suspensions”

(~\$700K Total; ~\$140K/year)

Mallinckrodt, Inc. (1998-2000, Yodh (PI))

“Extravasation Monitoring with Diffusing Near Infrared Light”

(~\$200K Total; \$100K/year)

Dupont Pharmaceuticals Company (1998-2000, Yodh (PI))

“Fine Particle Technology”

(~\$25K)

Army Research Office (1999-2002, Breast Cancer Idea Awards, Yodh (PI))

ARO DAMD17-97-1-7272

“Parallel, Rapid Diffuse Optical Tomography of the Breast”

(~\$450K Total; \$150K/year)

National Science Foundation (1999-2002, Yodh (PI))

NSF DMR-9971226

“Entropy, Assembly, and Novel Microscopy in Complex Fluids”

(~\$300K Total; ~\$100K/year)

National Institutes of Health (1997-2000, Yodh (PI))

NIH 1R01-CA075124-01

“Flow in Thick Tissues Probed by Diffusing Light”

(~\$1.05M Total ~\$350K/year)

David and Lucille Packard Foundation (2000-2005, Finkel, PI; Yodh, Co-PI)

Packard Foundation #2000-01737

“Mesoscale Optical Brain Imaging of Perceptual Learning”

(~\$500K Total; ~\$100K/year for Yodh, excluding equipment)

National Institutes of Health (2000-2003, Yodh (PI))

NIH 8R01-EB000283-06 (renewal)

“Flow in Thick Tissues Probed by Diffusing Light”

(~\$1.05M Total; ~\$350K/year)

National Institutes of Health (2000-2004, Yodh (PI))

NIH 2R01-CA075124-04

“Parallel Detection and Computation for Diffuse Optical Tomography of Breast”

(~\$1.6M Total; ~\$400K/year)

National Institutes of Health (2001-2006, PPG, Glatstein, PI; Yodh, Co-PI)

NIH P01-CA87971

“Photodynamic Therapy of Intraperitoneal Neoplastic Diseases”

(~\$1M Total; ~\$250K/year for Yodh Project)

National Science Foundation (2002-05, Yodh (PI))

NSF DMR-0203378

“Interactions and Assembly in Suspension”

(~\$330K Total; \$110K/year)

National Aeronautics and Space Administration, NASA (2003-2008, Flight Exp., Yodh (PI))

NASA NAG8-2172 (renewed)

“Entropically Driven Colloidal Assembly”

(~\$1.25M Total; ~\$225K/year)

National Science Foundation (2004, Klein, PI; Yodh, Co-PI & Shared Exp. Facility Co-Director)

NSF DMR-0320699

“Acquisition of Instrumentation for Viscoelastic Characterization Facility”

(~\$320K Total)

National Institutes of Health (Awarded to University of California, Irvine, 2003-2008, with NIH NTR01 subcontract to Yodh (Grant Co-PI; PI at Penn))

NIH NCI U54 CA105480

“Network for Translational Research in Optical Imaging: Breast Cancer Multi-Dimensional Diffuse Optical Imaging”

(~\$750K Total; ~\$150K/year for Yodh)

Department of Defense: Army Medical Research and Materiel Command (2004-2006, G. Yu (PI); Yodh (Co-I) – Yu was working in Yodh’s lab.)

DOD W81XWH-04-1-0006

“Real-time Diffuse Optical Measurement for In-vivo PDT Dosimetry of Human Prostate”

(~\$240K Total; ~\$120K/year)

National Institutes of Health (2004-2008, Yodh (PI))

NIH 1R01-HL077699-01

“Diffuse Light Imaging of Flow, Oxygen & Brain Metabolism”

(~\$1.4M Total; ~\$350K/year)

National Institutes of Health (2004-2008, Yodh (PI))

NIH 2R01-EB002109-08

“Multispectral II-Plate Diffuse Optical Breast Tomography”

(~\$2M Total; ~\$500K/year)

AstraZeneca (2004-2007, Yodh (PI))

“Diffuse Photon Spectroscopy and Imaging Pharmaceutical Formulations”

(~\$60K Total; ~\$20K/year)

National Science Foundation (2005-2011, Klein (PI), Yodh (Co-PI); Yodh replaced Klein, 2009)

NSF DMR-0520020

“Materials Research Science and Engineering Center (MRSEC), Klein/Yodh (Directors)”

Funding for center grant was generated by Klein (PI) in 2005; Yodh was PI starting 2009.

(~\$21.7M Total, ~\$3.6M/year)

National Science Foundation (2005-2008, Yodh (PI))

NSF DMR-0505048

“Structure and Dynamics in Temperature-Sensitive and Anisotropic Complex Fluids”

(~\$360K Total; \$120K/year)

Radiation Monitoring Devices, Inc. (2006-2007, Yodh (PI))

“Photon Counting Cameral for Diffuse Optical Tomography”

(~\$20K)

National Aeronautics and Space Administration, NASA (2008-2013, Flight Exp., Yodh (PI))

NASA NNX08A00G

“Entropically Driven Colloidal Assembly (Phase 2)”

(~\$300K Total; \$50K-\$60K/year)

National Institutes of Health (2008-2014, NIH BRP, Yodh (PI))

NIH/NINDS 2R01NS060653-01

“Diffuse Optics for Stroke Management”

(~2.5M Total; ~\$500K/year)

National Institutes of Health (2008-2014, PPG PI, Glatstein; Yodh, Co-PI,)

NIH 2P01-CA087971-06A1 (renewed)

“Photodynamic Therapy of Intraperitoneal Neoplastic Diseases”

(~\$1M Total; ~\$200K/year for Yodh Project)

National Science Foundation (2008-2012, Yodh (PI))

NSF DMR-0804881

“Temperature-Sensitive Complex Fluids”

(~\$480K Total; \$120K/year)

National Institutes of Health (2009-2014, Yodh (PI))

NIH 2 R01 EB 002109-12

“Multispectral II-Plate Diffuse Optical Breast Tomography”

(~\$2M Total; ~\$400K/year)

National Institutes of Health (2010-2015, RR Reddy, PI; Yodh, Co-PI)

NIH 5P41-RR002305-27

“A Resource for Magnetic Resonance and Optical Imaging”

(~\$500K Total; ~\$100K/year for Yodh, excluding equipment)

National Science Foundation (2009-2014, Ramos (PI); Klein/Yodh (Co-PI), Yodh replaced Klein as LRSM/MRSEC Director, 2009)

NSF DMR-0934195

“Partnership for Research & Education in Materials (PREM)”

Grant was written by Klein/Ramos (at Penn), but Yodh was PI starting 2009.

(~\$3M Total; ~\$500K/year, UPR-Penn partnership with Ramos, PI and Klein/Yodh, Co-PI)

National Science Foundation (2011-2014, Yodh (PI))

NSF DMR-1062638

“Research Experience for Undergraduates (REU) Site Grant”

(~\$276K Total)

National Science Foundation (2012-2016, Yodh (PI))

NSF DMR12-05463

“Novel Dynamics in Complex Fluids: From Phonons to the Drying Process”

(~\$480K Total; ~\$120K/year)

National Aeronautics and Space Administration, NASA (2013-2018, Yodh (PI))

NASA NNX08O0G (renewed)

“Low Volume Fraction Entropically Driven Colloidal Assembly (Phase 3)”

(~\$750K Total; ~\$150K/year)

National Science Foundation (2011-2017, Yodh (PI))

NSF DMR-1120901

“Materials Research Science and Engineering Center (MRSEC), Yodh (Director)”

(~\$22M Total, ~\$3.7M/year)

National Science Foundation (2014-2017, Yodh (PI))

NSF DMR-1359351

“Research Experience for Undergraduates (REU) Site Grant,” Yodh (PI)

(~\$180K Total; ~\$60K/year)

National Institutes of Health (Kofke, PI; Yodh, Co-PI, 2014-2018 (2019-NCE))

NIH R01- NS082309

“Detection of Cerebral Ischemia with a Noninvasive Neurometabolic Optical Monitor”

(~\$750K Total; ~\$100K-\$200K/year to Yodh, including equipment)

National Institutes of Health (NIH BRP Renewal, Yodh (PI), (2014-2019)

NIH 1R01-NS060653-06 (renewed)

“Diffuse Optics for Acute Stroke Management”

(~\$2.5M Total; ~\$500K/year)

National Institutes of Health (PPG, PI, Glatstein; Yodh, Co-I/collaborator, 2014-2019)

NIH 5P01-CA087971-09 (renewed)

“Photodynamic Therapy of Intraperitoneal Neoplastic Diseases”

(~\$375K Total; ~\$75K/year for Yodh)

National Institutes of Health (RR 2015-2020, Reddy (PI); Yodh (Co-PI))
NIH P41-EB015893 (renewed)

“A Resource for Magnetic Resonance and Optical Imaging”
(~\$500K Total; ~\$100K/year for Yodh, excluding instrumentation)

National Science Foundation (2015-2020, Ramos (PI); Yodh (Co-PI))
NSF DMR-1523463

“Partnership for Research & Education in Materials (PREM)”
(~\$3M Total; ~\$500K/year, UPR-Penn partnership with Ramos, PI and Yodh, Co-PI)

National Institutes of Health (RR, Schwartz, PI; Yodh, Co-PI, 2015-2019)
NIH U01-HD087180-01

“Developing a multi-modality, paradigm-shifting approach for in vivo assessment of the human placenta and the impact of maternal nutrition on its development and function”
(~\$600K Total; ~\$150K/year for Yodh)

National Institutes of Health (2016-2021, Floyd (PI); Yodh (Co-PI))
NIH U01-NS095761-01

“Spinal Fiber Optics Monitoring”
(~\$350K Total; ~\$50-150K/year for Yodh)

National Science Foundation (2016-2020, Yodh (PI))
NSF DMR-160738

“Elasticity, Deformation, Rearrangement & Assembly in Complex Fluids”
(~\$420K Total; ~\$140K/year)

National Science Foundation (2017-2020, Yodh (PI))
NSF DMR-1659512

“Research Experience for Undergraduates (REU) Site Grant”
(~\$295K Total)

National Science Foundation (2017-2018, Yodh (PI); Co-PIs: Detsi, Fakhraai, Winey, Heiney)
NSF DMR-1725969

“Acquisition of an Ultra-Small-Angle to Wide-Angle Dual Source X-ray Scattering Instrument for Materials Characterization”
(~\$539K Total)

National Science Foundation (2017-2023, Yodh (PI))
NSF DMR-1720530

“Materials Research Science and Engineering Center (MRSEC), Yodh (Director)”
(~\$22.6M Total, ~\$3.75M/year)

National Aeronautics and Space Administration, NASA (2018-2020, Yodh (PI))
NASA NNX0800G (evolved to flight experiment)

“Crystal to Glass Transitions in Colloids (Flight Experiment)”

(~\$225K Total; ~\$150K/year-1. ~\$75K/year-2)

National Science Foundation (2020-2025 (including NCEs), Yodh (PI))

NSF DMR-2003659

Routes of Relaxation and Reconfiguration in Soft Matter

(~\$530K Total; ~\$176K/year)

National Institutes of Health (2021-2026, Reddy (PI); Yodh (Co-PI))

NIH P41-EB029460

“Center for Advanced Metabolic Imaging in Precision Medicine (CAMIPM)”

(~\$500K Total for TRD 4 (Yodh); ~\$100K/year for Yodh, excluding instrumentation)