The Faculty of Medicine of Harvard University
Curriculum Vitae

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Education

1988	B.A. cum laude	Applied Mathematics	Harvard University
1997	Ph.D.	Electrical Engineering and Computer Science Advisor: James G. Fujimoto	Massachusetts Institute of Technology
1998	M.D. magna cum laude	Medicine	Harvard Medical School

Postdoctoral Training

1998-2001	Resident	Pathology	Massachusetts General Hospital
1999-2000	Clinical/Research Fellow	Pathology	Massachusetts General Hospital

Faculty Academic Appointments

2001-2004	Assistant Professor	Pathology	Harvard Medical School
2003-	Affiliated Faculty	Health Sciences and Technology	Harvard-MIT Division of Health Sciences and Technology
2004-2010	Associate Professor	Pathology	Harvard Medical School
2010-	Professor	Pathology	Harvard Medical School

Appointments at Hospitals/Affiliated Institutions *Past*

2001-2004	Assistant Physicist	Dermatology	Massachusetts General Hospital
2001-2008	Assistant Pathologist	Pathology	Massachusetts General Hospital
2004-2012	Associate Physicist	Dermatology	Massachusetts General Hospital
2008-2012	Associate Pathologist	Pathology	Massachusetts General Hospital

Current

2012-	Physicist	Dermatology	Massachusetts General Hospital
2012-	Pathologist	Pathology	Massachusetts General Hospital
2017-	Remondi Family Endowed MGH Research Institute Chair	MGH Research Institute	Massachusetts General Hospital

Other Professional Positions

1987-1991 Vice-president Vanguard Imaging, Ltd. 1993-1994 Consultant Signal Analytics 2000-2003 Consultant Infraredx, Inc.

2005-2010	Consultant	Prescient Medical, Inc.
2005-2010	Consultant	Cambridge Research and Instrumentation
2007-2009	Consultant	Merck Research Laboratories
2009-2012	Consultant	NinePoint Medical
2010-2012	Consultant	Samsung Advanced Institute of Technology
2017-2018	Consultant	SpectraWave

Major Administrative Leadership Positions

Local

2008-	Director	Wellman Center Photopathology Laboratory
2008-2012	Co-director of HST .035	Harvard-MIT Division of Health Sciences and Technology
2009-2013	Associate Director	Wellman Center for Photomedicine

Regional

2007-2010	Program Leader of Optical Diagnostics	Center for Integration of Medicine and Innovative Technology (CIMIT)
2017-	Board Member	SpectraWave
2020-2022	Co-director	Mass General Brigham Center for COVID Innovation
2024	Co-lead	MGB Research Strategic Plan – Sustaining Financial Strength Working Group

Committee Service

Local

2003-2004	Intellectual Property Committee *Chairman*	Wellman Center for Photomedicine, MGH
2003-2004	Search Committee for Director *Member*	Wellman Center for Photomedicine, MGH
2003-	Faculty Executive Committee *Member*	Wellman Center for Photomedicine, MGH
2007-	Faculty Search Committee	Wellman Center for Photomedicine, MGH, HST

Chairman

2007- HST MD Admissions Committee Harvard Medical School, HST *Member*

2010- MGH Pathology Research Committee of Professors *Member* MGH Pathology Department

2013 MGH Pathology Research Strategic Planning Committee *Member* MGH Pathology Department

2013- Research Advisory Board *Vice-chair* Markus Institute for Aging Research (MIFAR)

2013- Scientific Advisory Board *Member* Massachusetts Life Sciences Center (MLSC)

2013- External Advisory Board *Chair* Laser Biomedical Research Center at MIT

2013- Commercialization Council Partners Healthcare Innovation *Member*

2016- Executive Committee on MGH Massachusetts General Hospital Research (ECOR) *Member*

2016- Committee for Development Promotions *Member* Wellman Center for Photomedicine and

2016-2019 Committee for Promotions, Harvard Medical School Reappointments, and Appointments (P&R) *Member*

2019-2022 Subcommittee of Professors, Harvard Medical School *Member*

2020- CARPED (Cancer Risk, Prevention, Dana Farber, Harvard Cancer Center And Early Detection Program), *Co-Chair*

National

2008 Program Committee Technical Session, Gordon Research Conference *Chairman*

2009-2011 Vulnerable Plaque Working Group, National Heart Lung, and Blood Institute (NHLBI) *Member*

2010-2012 Transformation M4 Emerging Technology, College of American Pathologists *Team Leader*

2012-2021 CAP IVM Committee, College of American Pathologists *Founder and Chair*

International

2007 International Conference on Advances in Optics and Biotechnology, Engineering Conferences International

Co-chairman

2008-2012 International Working Group on Intracoronary OCT Standardization and Validation, International Committee on Intracoronary OCT Standardization and Validation
Founder and co-chairman

Professional Societies

1995- SPIE – International Society for Optical Engineering
Member

1995- Optical Society of America
Member

1998-2001 American Medical Association
Member

1998-2001 Massachusetts Medical Association
Member

2000- Association for Eradication of Heart Attack
Member

2000- American Heart Association
Member

2006- SPIE – International Society for Optical Engineering, Cardiovascular Photonics Program Committee
Co-Chairman

2006- SPIE – International Society for Optical Engineering, Endoscopic Microscopy Program Committee
Co-Chairman

2011- American College of Cardiology (ACC)
Fellow

2013- College of American Pathologists (CAP)
Fellow

2015- National Academy of Inventors (NAI) *Fellow*

2018- Optical Society of America (OSA) *Fellow*

2018- American Institute for Medical and Biological Engineering (AIMBE) *Fellow*

Grant Review Activities

2003	NIDDK Study Section *Ad hoc member*	National Institutes of Health
2005-2009	Microscopic Imaging (MI) Study Section *Standing member*	National Institutes of Health
2013-	MSLC Study Section *Standing member*	Massachusetts Life Sciences Center
2014	Imaging and Biomarkers for Early Cancer Detection *Ad hoc member*	National Institutes of Health
2016-2018	MEDI Study Section	National Institutes of Health

	Ad hoc member 2016-2018; Standing member 2018-	
2019-2020	IGIS Study Section	National Institutes of Health
	Standing member	
2020-2022	IGIS Study Section	National Institutes of Health
	Chair	

Editorial Activities

Ad hoc reviewer

1993-	Applied Optics
1998-	Optics Communications
1998-	Journal of the Optical Society of America
1993-	Optics Letters
2000-	Journal of Biomedical Optics
2001-	Optics Express
2001-	Applied Physics Letters
2003-	Circulation
2003-	Journal of the American College of Cardiology
2005-	Arteriosclerosis, Thrombosis, and Vascular Biology
2007-	Biomedical Optics Express
2007-	Nature
2011-	Science Translational Medicine
2011-	New England Journal of Medicine

Other Editorial Roles

2001	Editor
	The Handbook of Optical Coherence Tomography, Marcel Dekker
2005	Guest Editor
	Journal of Biomedical Optics
2010	Editor
	Atlas of Intracoronary OCT, Springer
2013	Guest Editor
	Biomedical Optics Express
2015-	Associate Editor
	Lasers in Surgery and Medicine

Honors and Prizes

1991 - 1996	NIH Fellowship	National Institute of General Medical Sciences (NIH)	Academic
1991-1998	MD/Ph.D. Fellowship	Harvard Medical School	Academic
1994	General Telephone & Electronics Engineering Fellowship	General Telephone & Electronics	Research
1995	Young investigator runner-up		
1996	Student abstract prize runnerup	American Heart Association	Research
1996	MIT Research Laboratory of Electronics Award		
2000	Partners in Excellence Group Leader		
2004	Edward M. Kennedy Award for Health Care Innovation		

American Gastroenterology Association	Research	Partners	Research
Massachusetts Institute of Technology	Research	Center for Integration of Medicine and Innovative Technology	Research

2007	International Academy of Science Technology of the Year Finalist	International Academy of Science	Research
2011	Terplin Lecturer	University of Arizona	Research
2012-2013	Mike and Sue Hazard Family MGH Research Scholar	Massachusetts General Hospital	Research
2013	Johns Hopkins Distinguished Professor of Pathology	Johns Hopkins	Research
2014	Top Translational Researcher (ranked 3rd)	Nature Biotechnology	Research in 2013
2015	NAI Fellow	National Academy of Inventors	Research
2017	Remondi Family Endowed MGHRI Chair	MGHRI	MGHRI
2019	Top 10 Technologies	MIT Technology Review	Research

Report of Funded and Unfunded Projects

Funding Information

Past

2000-2003
Endoscopic Confocal Microscopy by Spectral Encoding
National Science Foundation (NSF)Research
BES-0086709
PI ($270,000)
The goal of this work is to develop an endoscope compatible confocal microscope for identifying sub-cellular features diagnostic of early cancer and dysplasia.

2001-2003
Characterization of Coronary Plaques with OCT with Patient Event Follow-up
Advanced Cardiovascular Systems
Research
Co-PI
The goal of this project is to build and analyze an OCT database of human coronary plaques and demonstrate the clinical potential of intracoronary OCT in patients.

2002-2003
Speckle Imaging for Plaque Characterization
Center for Innovative Minimally Invasive Technology

Research
PI ($75,000)
The goal of this project is to investigate a new method for characterizing atherosclerotic plaque structure and composition. The method is based on the temporal decorrelation of multiple scattered coherent light.

2002-2005 Spectrally Encoded Miniature Endoscopy
The Whitaker Foundation
Research
PI ($236,289)
The goal of this project is to investigate a new imaging technology for ultraminiature endoscopy and laparoscopy, permitting the diagnosis of disease in previously inaccessible areas of the body.

2002-2006 In-situ Measurement of Plaque Biomechanical Properties (Bouma)
National Institutes of Health
Research
R01HL70039
Investigator
The goal of this project is to validate and apply an optical coherence tomography (OCT) imaging method for assessing stress, strain and compliance in coronary vessels in vivo.

2003-2004 Low Coherence Interferometry System for Guidance in Lumbar Punctures Center for Innovative Minimally Invasive Technology
Research
PI ($25,000)
The goal of this project is to investigate the use of low coherence interferometry to provide interactive guidance of the lumbar puncture needle in real-time and identify adjacent tissue types before they are penetrated.

2003-2004 Polarization Sensitive OCT (PS-OCT) Assessment of Collagen in Atherosclerotic Plaques
Center for Innovative Minimally Invasive Technology
Research
PI ($75,000)
The objective of this study is to investigate the measurement of collagen by quantifying birefringence in atherosclerotic plaques using PS-OCT.

2003-2008 Fast OCT Technology for Comprehensive Diagnostic Imaging (deBoer)

National Institutes of Health
Research
R01RR19768
Investigator
The goals of this project are to develop a new, parallel detection form of OCT that provides vastly improved image acquisition rate and resolution. The new technology will be used for early detection and treatment of glaucoma, characterization of vulnerable plaques responsible for acute myocardial infarction, and for surveillance for esophageal neoplasia in patients with Barrett's esophagus.

2003-2008 Low Coherence Interferometry Guided Fine Needle Aspiration
Department of Defense, MFEL Program
Research
FA9550-04-1-0079
PI ($299,488)
The goal of this project is to develop an optically guided needle for fine needle aspiration of palpable masses.

2003-2008 Simultaneous Fluorescence Lifetime, Excitation, and Emission Spectral Measurement
Department of Defense, MFEL Program
Research
FA9550-04-1-0079
PI ($301,932)
The goal of this research is to develop a novel Fourier transform fluorescence spectroscopy technique for simultaneously detecting silicon quantum dots with unique excitation, emission, and lifetime properties.

2003-2017 Improving Screening and Surveillance in Barrett's Patients
National Institutes of Health
Research, Clinical Study
R01CA103769-10
PI ($1,508,848) The goal of this project is to expand the current diagnostic capabilities of OCT, develop a standalone imaging method for systematically evaluating the distal esophagus, and test these new methods for screening and surveillance in patients.

2004-2006 Endoscopic Full-field Optical Coherence Microscopy System for Clinical Diagnostics
Center for Innovative Minimally Invasive Technology
Research
PI ($75,000)
The goal of this research is to develop a novel imaging technology that will enable endoscopic imaging of human tissue at resolution sufficient to visualize cellular

substructure, thereby providing clinicians with a tool that will bring endoscopic optical biopsy closer to realization.

2004-2017 Natural History of Vulnerable Coronary Plaques
National Institutes of Health (NHLBI)
Research, Clinical Study
R01HL076398
PI ($2,212,849)
The goal of this project is to expand the current diagnostic capabilities of OCT to investigate the incidence, prevalence, and natural history of vulnerable plaques and determine the morphologic predictors of acute myocardial infarction

2006-2008 Comprehensive Architectural and Cellular Endoscopic Microscopy
National Institutes of Health
Research
R21CA122161
PI ($208,644)
The goal of this work is to develop an endoscopic confocal microscope for identifying sub-cellular features diagnostic of early cancer and dysplasia.

2006-2008 Raman Spectroscopy of Coronary Atherosclerosis
Prescient Medical Incorporated
Research
PI ($973,852)
The goal of this study is to develop a state-of-the-art Raman spectroscopy system and 3.0 F intracoronary catheter for the chemical characterization of coronary plaque in the presence of intraluminal blood.

2006-2008 Optical Frequency Domain Imaging for the determination of cerebral aneurysm rupture risk
Center for Innovative Minimally Invasive Technology
Research
2006A014969
PI ($79,814)
The goal of this research is to develop a high-resolution structural imaging method for imaging cerebral artery walls that is capable of discriminating rupture-prone from benign aneurysms.

2007-2009 Portable Smart Needle Device
Department Bridge Funding MFEL

Research
PI ($120,000)
The goal of this research is to construct a miniature, battery-powered optical frequency domain imaging system for guidance of needle placement during vascular access.

2007-2009 Laser Speckle Imaging for Tissue Perfusion
Department Bridge Funding MFEL
Research
PI ($120,000)
The goal of this project is to develop a laser speckle hand-held imaging system for determining depth-resolved tissue perfusion.

2007-2009 Simultaneous Fluorescence Lifetime, Excitation, and Emission Imaging
Department Bridge Funding MFEL
Research
PI ($120,000)
The goal of this research is to develop a novel Fourier fluorescent technique for determining the excitation, emission, and lifetime properties of biological samples.

2007-2009 Laser Speckle Imaging for Evaluating Compartment Syndrome
Department Bridge Funding MFEL
Research
PI ($120,000)
The goal of this project is to create a portable imaging device for diagnosing the early stages of compartment syndrome, prior to the occurrence of irreversible ischemia.

2007-2010 Smart Optical Probe for Guidance of Fine Needle Biopsy National Institutes of Health STTR w/Physical Sciences Inc.
Research
1R43CA114896
PI ($38,117)

Validation of an optical method for improving the diagnostic yield of fine needle biopsy.

2007-2010 Program Leadership Award for Optical Diagnostics
Center for Innovative Minimally Invasive Technology (CIMIT)
Research
200A052999
PI ($25,000)
This fund supports Dr. Tearney's efforts to manage CIMIT's Optical Diagnostics Program

2007-2012 Miniature Laser Therapy Endoscope
National Institutes of Health
Research
R21EB007718-03
PI ($1,177,316) The goal of this project is to further research on effective ablation therapy through the development of an integrated miniature imaging/laser-ablation probe.

2008-2009 Micro-mirror Based 3D-Endoscopy
Center for Innovative Minimally Invasive Technology
PI ($35,861)
The goal of this project is to investigate the clinical utility of a newly developed MEMS scanning mirror for three-dimensional microscopic imaging inside the body

2008-2009 Chemical Analysis of Coronary Atherosclerosis in Patients
MGH ECOR Formulaic Bridge Support
Research
PI ($50,000)
Development of an Intracoronary Raman Catheter System. This study will develop a state-of-the-art Raman spectroscopy system and 3.0 F intracoronary catheter for the detection of lipid beneath blood.

2008-2010 Optical Frequency Domain Imaging of Gastrointestinal and Pulmonary TractsOlympus Medical
Research, Clinical Study
PI ($1,360,000)

The goal of this project is to determine the applications of endoscopic optical frequency domain imaging in the gastrointestinal and pulmonary tracts. Clinical feasibility studies will be conducted in the esophagus, bile duct, pancreas, duodenum, liver, and colon.

2008-2010 Density Multiplexed Fluorescence Imaging by Fourier Transform Fourier Transform Fluorometry
National Institute of Health
Research
K99EB008737 (Peng)
Mentor ($180,000)
The goal of this project is to develop a novel Fourier transform fluorescence technique for simultaneously detecting different fluorescent markers with unique excitation, emission, and lifetime properties.

2008-2012 Chemical Analysis of Coronary Atherosclerosis in Patients
National Institutes of Health
Research
R01HL093717-01
PI ($1,903,396)
The goal of this project is to develop an intracoronary catheter for measuring the chemical and molecular composition of atherosclerotic plaques in living human patients.

2008-2013 Optical Imaging for Pulmonary Microstructure, Function, and Gas Delivery American Air Liquide Inc.
Research
PI ($1,250,000)
The goal of this research is to determine the three-dimensional structure and function of mammalian alveoli.

2009-2010 Improving Screening & Surveillance in Barrett's Patients MGH
ECOR Interim Support Funds
Research, Clinical Study
PI ($50,000)
The goal of this project is to utilize probe-based Optical Frequency Domain Imaging as a tool for screening and surveillance of patients with Barrett's Esophagus (BE).

2009-2011 Comprehensive Confocal Microscopy for Image Guided Biopsy
National Institutes of Health
Research
R21CA141884-01
PI ($799,298)

The goal of this research is to develop and test a novel method for imaging entire epithelial tissue surfaces to diagnose cancer and subsequently mark these locations so that they may be biopsied.

2010-2013 Transnasal Probe for Diagnosing Eosinophilic Esophagitis
MGH ECOR Formulaic Bridge Support
Research, Clinical Study
PI ($50,000)
The goal of this project is to develop a transnasal probe to investigate the clinical utility of using Spectrally Encoded Confocal Microscopy (SECM) for diagnosing Eosinophilic Esophagitis.

2011-2018 (NCE) Transnasal Probe for Diagnosing Eosinophilic Esophagitis
National Institute of Health
Research
R01DK091923
PI ($3,602,339)
The goal of this proposal is to provide an accurate and inexpensive diagnostic tool for Eosinophilic Esophagitis.

2012-2014 Intravascular Imaging of Atheroma of Inflammation and Structure
Merck Research Laboratories
Research
PI ($91,872)
The goal of this project is to conduct microstructural and molecular imaging of rabbit atheroma and evaluate the inflammatory content in response to statin therapy.

2012-2015 Murine Aortic Valve Micro-calcification Imaging Ex Vivo with 1-μm Resolution OCT
National Institutes of Health/Brigham and Woman's Hospital (PI: Aikawa)
Research
1R01HL114805
Investigator ($250,000)
Develop temperature-controlled sample chamber for μOCT imaging of the aortic valves ex vivo.

2012-2017 MGH Research Scholars
Research

PI ($500,000)
The goal of this research is to design and fabricate devices for imaging at nanoscale resolution within the body.

2012-2017 Functional Anatomic Imaging of CF Patients with Early Lung Disease Using μOCT
University of Alabama
Research
1R01HL116213
MPI ($2,080,197)
The major goals of this project are to develop a portable high-resolution μOCT system for imaging the respiratory epithelium.

2012-2020 Next Generation Molecular-microstructural Arterial Imaging System and Catheter
Canon
Research
PI ($3,506,300)
The goal of this project is to design, fabricate and test multimodality imaging for microstructural and molecular imaging of the coronary artery wall in vivo.

2013-2017 Light-enhanced Portable Ultrasound for Early Management of Hemorrhagic Shock.
Air Force Office of Scientific Research (AFOSR)
Research
FA9550-13-1-0068
PI ($350,000)
The goal of this project is to develop a minimally invasive technology for monitoring pulmonary arterial oxygen saturation.

2013-2017 Tethered capsule endomicroscopy guided duodenal juice sampling for pancreatic cancer screening
Wellman Discovery Fund
Research
PI ($115,000)
The primary goal of this work is to develop a swallowable, capsule-based technology for sampling pancreatic fluids.

2013-2018 Boston Biomedical Innovation Center National Institutes of Health/NHLBI (Parrish)
Research
1U54HL119145-01
Investigator ($24,439)
The major goal is to establish the regional Boston Center for Accelerated Innovation in Therapeutics, Devices, and Diagnostics for Heart, Lung, Blood, and Sleep Disorders (B-BIC, or the Boston Biomedical Innovation Center).

2014-2016 Needle-based Imaging Device for Comprehensive Microscopic Imaging of the Prostate
Collage Medical Imaging
Research
Investigator ($240,000)
The goal of this study is to develop a needle-based imaging device for comprehensive microscopic imaging of the prostate.

2014-2018 NIRF-OFDI of Inflammation in Atheroma Progression and Stent Complications
National Institutes of Health (Jaffer)
Research
NIH R01HL122388
Investigator ($845,976)
The major goal of this project is to conduct preclinical studies using OCT-NIRF to study arterial pathology in diseased animal models.

2014-2018 Molecular Pathogenesis and Phenotype of Acquired CFTR Dysfunction in COPD
National Institutes of Health (Rowe)
Research
NIH R01HL105487
Investigator ($556,008)
The major goal of this project is to develop and utilize μOCT to characterize mucociliary clearance diseased Ferret models of COPD.

2015-2018 Polarization Sensitive μOCT for Uric Acid Crystal Detection in Coronary Arteries
Ardea Biosciences
Research
PI ($381,400)
The major goals of this project are to construct a polarization-sensitive version of highresolution Micro-Optical Coherence Tomography (μOCT) that will enable the assessment of negatively birefringent uric acid crystals in fresh, unfixed cadaver coronary arteries and utilize the technology to determine the prevalence of uric acid crystals in human coronary plaque *ex vivo*.

2015-2019 Capsule endoscopy for visualization and biopsy of the small intestine in children with Environmental Enteric Dysfunction (EED)

Bill & Melinda Gates Foundation
Research, Clinical Study
OPP1135172
PI ($3,758,812)
The goal of this study is to provide a minimally invasive means for obtaining detailed information on infantile intestinal tissue needed for the development of effective EED interventions.

2016-2017 Development of a small SECM endoscopic capsule for diagnosing EoE in children
American Partnership for Eosinophilic Disorders
Research
PI ($50,000)
The goal of this work is to develop a small, swallowable, tethered capsule that can visualize esophageal eosinophils in vivo and diagnose eosinophilic esophagitis (EoE) in children.

2016-2018 (NCE) In Vitro Human Models for Individualized Response to CFTR Modulators
National Institutes of Health (Solomon)
Research
NIH R41HL130207
Subcontract PI ($65,561)
The major goal of this project is to generate new computer methods and algorithms to quantify the function of cultured ciliated airway cells to minimize manual input for the purpose of improving throughput of measuring functional responses to CFTR modulator drugs.

2017-2018 Phase 4, 2-part Exploratory Study to Assess the Feasibility of Using μOCT and to Evaluate the Effect of Lumacaftor in Combination with Ivacaftor on the Nasal Epithelium Using μOCT in Subjects with CF Who Are Homozygous for the F508delCFTR Mutation
University of Alabama
Research, Clinical Study
Subcontract PI ($428,366)
The major goal of this project is to utilize μOCT compare measurements of nasal mucociliary clearance in CF subjects upon Orkambi administration.

2016-2018 Light-enhanced transesophageal echocardiography (leTEE)DL Meditech
Research, Clinical Study
PI ($386,900)
The major goal of this project is to develop and clinically translate a photoacoustic esophageal probe capable of non-invasively measuring mixed venous oxygen saturation and pulmonary artery pressure.

2018-2020 Intravascular OCT-Pressure Catheter

Vivolight Medical Device & Technology Co.
Research
PI ($369,200)
The goal of this program is to develop an intravascular OCT/pressure sensing catheter.

2019-2020 Develop and validate SD-OCT imaging system with Hamamatsu light source
Hamamatsu Photonics
Research, Clinical Study
PI ($191,800)
The goal is to determine the OCT imaging capabilities of a new supercontinuum light source from Hamamatsu.

2012- 2021 Endoscopic Imaging System iLumen
Medical
Research
A213373.06
PI ($1,513,356)
The goal of this project is to develop an endoscope attachment that enables visualization of the luminal organ with a 360-degree angle field of view.

2014-2021 Natural History of Barrett's Esophagus Using Capsule Endomicroscopy
National Institutes of Health
Research
NIH R01CA184102
PI ($3,416,560)
The goal of this study is will significantly contribute to the knowledge of Barrett's Esophagus (BE), allowing us to answer longstanding questions about its microscopic definition, its progression and clinical significance, and the effectiveness of ablative BE therapies.

2014-2021 Celiac Disease Diagnosis using Tethered Capsule Endomicroscopy
National Institutes of Health
Research
NIH R01DK100569
PI ($2,726,036)
The major goals of this project are to develop and clinically validate a novel, swallowable capsule that conducts spectrally encoded confocal microscopy (SECM) to provide an accurate tissue diagnosis of celiac disease.

2015-2021 Ultraminiature Endoscope
Canon
Research
A210162
PI ($2,525,600)
The goal of this project is to develop the world's smallest endoscopes for a variety of clinical applications.

2016-2021 Development of Optical Coherence Tomography for Measuring of Mucociliary Clearance
Cystic Fibrosis Foundation Therapeutics, Inc.
Research
TEARNE16XX0
PI ($645,200)
The goal of this project is to develop a high-resolution imaging modality for assessing respiratory epithelia cilia and the periciliary layer in Cystic Fibrosis patients in vivo.

2016-2021 Mechanisms of and Therapies for Abnormal Mucus Adhesion and Clearance in CF
Board of Trustees of the University of Alabama for the University of Alabama
Originating Sponsor Name: Cystic Fibrosis Foundation
Subcontract PI ($56,607)
The project's goal is to perform complementary uOCT and fluorescence imaging experiments on cell tissue samples at MGH to validate measurements obtained at UAB.

2016-2020 Core Center for measurements of mucus and mucociliary clearance
Board of Trustees of the University of Alabama for the University of Alabama
Originating Sponsor Name: Cystic Fibrosis Foundation
Subcontract PI ($48,845)
The goal of the project is to upgrade a high throughput screening platform using uOCT to image 24-well cell culture plates.

2016-2023 In Vivo Laser Capture Microdissection
National Institutes of Health
Research
NIH R01EB022077
PI ($2,668,782)
The major goals of this project are to develop a new biopsy technology that obtains microscopic images of entire organs, identifies specific sites of diseased tissue based

on tissue microstructure, and isolates these tissues by adhering them to the device in vivo.

2017-2021 Tethered Capsule Tissue Capture and Microbiome Collection
Boston Scientific Company
Research
PI ($329,900)
The major goal of this project is to develop a capsule-based technology for isolating targeted tissue while retaining micromorphology.

2017-2022 Intravascular 3D Printing for Bleeding Control Project 4
Air Force Office of Scientific Research
FA9550-17-1-0277
PI ($1,029,133)
The major goal of this project is to develop non-invasive technology for 3D printing devices in blood vessels.

2017-2022 Translational Program in CFTR-Related Airway Diseases
Board of Trustees of the University of Alabama for the University of Alabama Research
NIH R35HL135816
Subcontract PI ($1,040,045)
The major goals of this project are to provide technical support to the existing μOCT technology in Rowe Laboratory and to Improve and develop μOCT image processing and analysis software.

2018-2023 Tethered capsule endomicroscopy for detailed visualization of the Crohn's bowel wall
Leona M. and Harry B. Helmsley Charitable Trust
Sponsor Number: 2019PG-CD023
PI ($3,436,221)
The goals of this project are to develop capsule technology for imaging inflammation and fibrosis in the terminal ileum and colon in Crohn’s patients.

2018-2023 Endomicroscope for diagnosis and therapy of hearing loss
WayVector Inc.
PI ($3,037,459)

The goals of the project are to develop and optimize the pre-clinical intracochlear μOCT imaging catheter, standardize the probe for clinical usage, and develop and optimize the pre-clinical μOCT system for intracochlear imaging.

2018-2022 Promise-OB-18
Board of Trustees of the University of Alabama for the University of Alabama
Originating Sponsor Name: Cystic Fibrosis Foundation
PROMISE-OB-18
Subcontract PI ($245,197))
The objective of this study is to use nasal μOCT imaging to assess how the effect of triple combination therapy (TCT) alters the functional microanatomy of the nasal airway in CF patients and evaluate the biological and clinical effects of significantly corrected CFTR function.

2017-2021 Field-deployable, Transesophageal Hemorrhagic Shock Detector
Department of Defense/Henry Jackson Foundation
HU0001-17-2-0009
PI ($5,166,043)
The goal of this project is to develop a Transesophageal Echo-Oximeter (TEO) as a thin probe that can be administered transnasally, enabling it to be used by first responders on the battlefield.

2018-2021 Tethered capsule endomicroscopy for detecting upper gastrointestinal diseases
CN USA Biotech Holdings
Research
PI ($2,045,500)
The goals of this project are to 1) develop tethered capsule SECM endomicroscopy for detecting stomach cancer, 2) validate tethered capsule SECM endomicroscopy for detecting EoE, and 3) validate tethered capsule SECM endomicroscopy for detecting esophageal squamous cell neoplasia.

2018-2024 Less invasive assessment of inflammation and subepithelial remodeling in eosinophilic esophagitis patients
National Institutes of Health
Research
NIH R01DK118509
PI ($2,646,119)
The major goal of this project is to develop and clinically translate a swallowable capsule that can simultaneously assess esophageal eosinophilia and subepithelial remodeling in EoE. patients.

2018-2024 Mike and Sue Hazard Family Fund for Future Medicine

Research
PI ($250,000.00)
The aim is to provide resources to help develop the next generation of microscopic imaging and non-invasive surgery technologies.

2019-2022 Polarization-sensitive μOCT for uric acid crystal and inflammation quantification in patients with gout
AstraZeneca
Research, Clinical Study
PI ($98,100)
The goal is to determine uric acid crystal content and inflammation in gout vs. nongout patients.

2019-2021 Development and pre-clinical validation of intracoronary uOCT imaging
CN USA Biotech Holdings, Inc
Research
PI ($2,157,926)
The goal is to demonstrate the safety and feasibility of imaging human coronary arteries in vivo with intravascular uOCT.

2019-2021 To study the use of Translate Bio's mRNA therapy (MRT) approach to treat pulmonary disorders by micro-optical coherence tomography (μ-OCT)
Translate Bio MA, Inc.
Research
PI ($598,800)
The proposed work will examine the efficiency of delivered MRT-PCD genes mRNA to mutant cells to restore function. Translate Bio will generate the in vitro and in vivo models and the Tearney Lab will acquire μ-OCT from the models and will analyze the data using their custom software for μ-OCT analysis.

2019-2024 Capsule endomicroscopy for small intestine sampling & visualization in EED Bill and Melinda Gates Foundation
Research, Clinical Study
INV-000801
PI ($6,143,353)
The primary goal is the translation and dissemination of these minimally invasive medical devices (TNIT and TNIT-compatible image-guided brush biopsy, cryobiopsy, and IPD) that will enable the detailed evaluation of the small intestines of infants and

pregnant women for the development of effective environmental enteric dysfunction (EED) interventions.

2020-2022 Development of Optical Coherence Tomography for Measuring of Mucociliary Clearance
Cystic Fibrosis Foundation
Research
TEARNE16XX0
PI ($297,883)
The goal is to develop an μOCT-compatible confocal fluorescence imaging system to better image ionic transport defects commonly encountered in CF.

2020-2022 Mass General Brigham Center for COVID Innovation Fund
Sundry
Research
PI ($200,000)
The goal of this project is to support Mass General Brigham's efforts to combat the COVID pandemic.

2020-2024 Proj 6: LEUS -Multifunctional Portable ultrasound
Proj 6 Air Force Office of Scientific Research
Research
FA9550-20-1-0063
PI ($982,249)
The goal of this project is to develop and validate technology for monitoring pulmonary arterial oxygen saturation that can be inserted transnasally and automated for use by minimally trained medics on the battlefield.

2020-2022 Canon Addendum 2 -Phase III Pre-Clinical - Next-gen molecular-microstructural arterial imaging system and catheter.
Canon USA, Inc.
Research
PI ($682,726)
The goal is to develop a multimodality OCT-fluorescence catheter and system for intravascular applications.

2020-2021 Miniature Intracochlear Imaging Probe Based on Micro-Optical Coherence Tomography for Cellular-Level Diagnosis and Therapy of Hearing Loss.
Massachusetts Eye and Ear Infirmary
Originating Sponsor: Department of Defense-Congressionally Directed Medical Research
W81XWH2010855
PI ($86,385)

The goals are to develop and validate a preclinical-grade uOCT imaging system, rotary junction, and uOCT probes for 3D imaging of cochleae and a clinical-grade uOCT imaging system, rotary junction, and uOCT probes using an industry-standard design control process.

Current

2008-2024 Photopathology / Microscopy Core
Wellman Center for Photomedicine Internal Funding
PI ($449,684)
Dr. Tearney is the director of Wellman Center's Photopathology and Microscopy core laboratory, which provides histopathology and advanced microscopy services to Wellman Center investigators.

2018-2024 Primary Care Innovative Technologies Research Fund
John and Dotti Remondi Family Foundation
Research
PI ($1,500,000)
The primary goal of this work is to develop new technologies for primary care screening for esophageal cancers.

2018-2024 Unique value of real-time shear stress to enhance coronary disease management NIH-NHLBI National Heart, Lung, and Blood Institute
Research
5R01HL140498
PI ($3,934,409)
The major goal of this project is to generate a new catheter-based technology for measuring coronary endothelial shear stress in the cardiac catheterization lab.

2019-2024 A tethered capsule endoscopic-endomicroscopic (TEEM) approach for improving upper GI tract diagnosis.
NIH-NIDDK National Institute of Diabetes and Digestive and Kidney Diseases
Research
5R01DK117236
PI ($2,567,133)
The goal is to develop and validate a swallowable, tethered capsule that obtains video and cellular-resolution microscopic imaging data of the entire upper GI tract. This improved method for upper gastrointestinal tract diagnosis will allow us to detect and treat gastrointestinal diseases in many more patients while lowering healthcare costs.

2019-2025 Preclinical Validation of Photobiomodulation Therapy for Sensorineural Hearing Loss
Geneva Foundation
Originating Sponsor Name: Uniformed Services University of the Health Sciences
Research
00011920056
PI ($2,247,678)
The overall goal of all projects is to study how photomedicine has the potential to enhance performance, stimulate healing, and modulate recovery and health. 2020-2025
Core Center for Measurement of Mucus and Mucociliary Clearance
University of Alabama, Birmingham
Research
PI ($239,352)
Major Goals: The Tearney laboratory will provide expertise in applying new methods to measure mucus clearance and mucus rheology using uOCT imaging, which was obtained at Rowe lab (UAB) and sent to MGH for analysis.

2021-2026 Dynamic μOCT for cellular tissue phenotyping
NIH-National Institutes of Health
Research
5R01CA265742-02 PI
($3,075,114)
In this proposal we will develop a cross-sectional imaging technology termed dynamic μOCT (DμOCT) that identifies distinct cells and tissues using intracellular motility signatures, a proxy of cell activity and state.

2021-2024 Miniature Intracochlear Imaging Probe Based on Micro-Optical Coherence Tomography for Cellular-Level Diagnosis
Board of Trustees of the Leland Stanford Junior University
Originating Sponsor Name: NIH-National Institutes of Health
Research
5R01EB034107-03
PI ($575,363)
MGH will be responsible for all μOCT technology development and the provision, maintenance, and support

2022-2026 Screening for Barrett's Esophagus Progressors with Multimodality Tethered Capsule Image-Guided Biopsy
NIH-National Institutes of Health
Research
5R01EB034107-03
PI (2,559,999)
The goals of the project are to develop a swallowable capsule that obtains image targeted biopsies from patients with Barrett's esophagus to determine whether they are at risk for developing esophageal adenocarcinoma.

2022-2027 Clinical translation of targeted intracoronary imaging for inflammatory activity
NIH-National Institutes of Health
Research
5R01HL165453-03
PI ($3419839)
The goal is to develop new intracoronary imaging to improve the diagnosis and treatment of coronary artery disease.

2024-2027 Operating on the Heart from Within Through Innovative Machine Learning and Imaging Physics
American Heart Association, Inc.
Research
24CSA1255237
Co-Investigator ($750,000)
This collaboration aims to achieve innovative solutions for minimally invasive physiological repairs to reduce heart failure and its resulting mortality.

2022-2025 Lower Airway Potential Difference Measurements with Integrated Endobronchial Catheter in Subjects with and without Cystic Fibrosis
University of Alabama, Birmingham
Research
000534641
PI ($456,027)
This project aims to develop and validate a clinically viable probe for measuring the voltage across respiratory epithelia.

2022-2025 Translational Program in CFTR-Related Airway Diseases
University of Alabama, Birmingham
Research
004507222
PI ($273,600)
The Tearney Lab will continue to improve and develop μOCT image processing and analysis software to quantify the functional microanatomy parameters related to mucociliary clearance in cultured cells and tissues, animal models in vivo, and patients with CF and COPD in vivo. The Tearney lab will also produce μOCT intranasal probes that can be used for airway imaging human patients with CF, COPD, and other respiratory diseases.

2023-2024 Assessment of novel technologies for early detection of cancer in individuals with germline cancer predisposition Dana-Farber Cancer Institute, Inc.

Research
DF/HCC Incubator Award
PI ($100,000)
This project aims to test the feasibility of a new tethered capsule endomicroscopy imaging device for detecting colorectal adenomas in unsedated Lynch syndrome patients.

2023-2026 Clinical OCT-NIRAF Study Using Canon System and Catheter
Canon Medical Systems Corporation
Research, Clinical Study
PI ($651,512.00)
Demonstrate that clinical intracoronary OCT-NIRAF imaging performed with Canon Medical Research USA technology is safe, feasible, and obtains clinical information that is useful for the assessment of patients with coronary artery disease

2023-2026 Next generation tethered capsule endomicroscopy platform for clinically and commercially viable esophageal cancer screening
U.S. Army Medical Research Acquisition Activity
Research
HT9425-23-1-0694
PI ($1,660,868)
The goal is to develop a commercially viable, single-use, TCE detection tool will enable the commercialization of the device in a primary care setting. The development will include increased swallowability, lower cost, and automated BE detection.

2023-2026 P10: Automated AI-based Transesophageal Echo-Oximeter (TEO) Hemorrhagic shock detection

Air Force Office of Scientific Research
Research
FA9550-23-1-0656
PI ($1,146,749)
The goal is to conduct research in optic and photonic solutions to military medical problems.

2023-2026 Electrical Impedance Spectroscopy-guided Endotracheal Tube Proj 11
Air Force Office of Scientific Research
Research
FA9550-23-1-0656
PI ($1,071,559)
The goal is to conduct research in optic and photonic solutions to military medical problems.

2024-2025 CP-μOCT for studying cholesterol and uric acid crystal deposition in atherosclerotic coronary plaque
Horizon Therapeutics USA, Inc.
Research
PI ($307,854)
The goal is to understand the morphological and pathobiological contexts of cholesterol crystals (CC) and uric acid crystals (UAC) in coronary artery disease (CAD).

2024-2025 Wireless Retroview Capsule for AI Upscale
AI-Lumen Medical, LLC
Research
PI ($310,752)
The Tearney Laboratory will design, test, and fabricate the Wired Video Transmitter scope, the Wireless Video Transmitter, and the AI Capable Receiver Station to conduct preclinical testing as well as prepare for limited clinical studies. The Tearney Laboratory will provide technical support for all transmitter devices and systems used in preclinical testing.

2024-2025 Dual wavelength compact photoacoustic imaging system and smart needle Bloch
QUANTUM Imaging Solutions, Inc
Research
PI ($475,260)
The goal is to develop a portable photoacoustic imaging system for functional thyroid/breast cancer imaging diagnosis and biopsy guidance

2024-2028 Blood Gas Analysis Without the Laboratory
NIH-National Institutes of Health
Research
1R01HL175892
Co-Investigator ($2,927,056)
The goal is to create blood gas analysis technologies that can transform the measuremen from a time-consuming and resource-intensive process into an automated, efficient, and precise diagnostic bedside or indwelling tool.

2024-2029 Colorectal Cancer Screening with Optical Coherence Tomography
NIH-National Institutes of Health
Research
1R01CA280972
PI ($3,432,396)

In this grant, we will overcome the high cost and inefficacies of colonoscopy for cancer screening by developing and validating new in vivo microscopic imaging technologies for detecting and treating cancer precursors called colorectal adenomas. Successful completion of this research will significantly improve colorectal cancer screening through higher adenoma detection rates and real-time diagnosis and a less invasive screening tool that can automatically detect and treat adenomas at the point of care without requiring sedation or anesthesia.

2014-2025 PI ($8,300,000)
Remondi Family Foundation Gift
Major Goals: Gift to support Tearney laboratory at MGH Remondi Family Foundation

Formal Teaching of Residents, Clinical Fellows, and Research Fellows (post-docs)
Wellman Center for Photomedicine, Massachusetts General Hospital, Harvard Medical School

1997- Wellman Tutorial Lecture Series

50 (graduate students, postdoctoral, clinical fellows) Lecturer 10 hours

2001- Wellman Photomedicine Lecture Series
50 (graduate students, postdoctoral, clinical fellows) Lecturer 10 hours

2002- Optical Diagnostics Tutorial Series
50 (graduate students, postdoctoral, clinical fellows) Lecturer 10 hours

2007- Wellman-HST Biomedical Optics Summer Institute
30 (undergraduate students) Lecturer 5 hours

Laboratory and Other Research Supervisory and Training Responsibilities
Wellman Center for Photomedicine, Massachusetts General Hospital, Harvard Medical School

1997- Supervision of undergraduate, graduate, post-doctoral research fellows — Daily mentorship since 2001

Formally Supervised Trainees

1997-1999 Stefan Brand, M.D. — Staff gastroenterologist, University of Munich Co-author
on three manuscripts, one as first author (Endoscopy).

1998-2000 John Poneros, M.D. — Associate Professor, Columbia University Medical Center
Co-author on four manuscripts, two as first author (Gastroenterology and Gastrointestinal Endoscopy).

1998-2000 Kelly Schlendorf — Emory Medical School Graduate
Co-author on four manuscripts.

1998-2003 George Asimellis, Ph.D. Scientist, Philips Electronics North America
As first employee of Tearney lab, assisted in developing first imaging probes.

1999-2001 Dong-Heon Kang, M.D., Ph.D. Staff cardiologist, Saint Mary's Medical Center, Seoul, Korea Co-author on three manuscripts.

1999-2011 Milen Shishkov, Ph.D. Senior Research Scientist, Harvard Medical School
Co-author on twenty-two manuscripts. He has become one of the leading experts on developing optical imaging probes.

2000-2002 Chris Kauffman University of Indiana Medical School Graduate Co-author
on four manuscripts.

2000-2002 Hiroshi Yabushita, M.D. Staff cardiologist, Kinki University School of Medicine, Osaka, Japan Co-author on four manuscripts, one as first author (Circulation).

2000-2005 Nicusor Iftimia, Ph.D. Leader of Biomedical Optical Technologies at PSI, Physical Sciences, Inc,
Co-author on thirteen manuscripts, three as first author (JBO, Optics Express, Rev. Sci. Instr.).

2001-2002 Costas Pitris, M.D., Ph.D. Associate Professor, EECS, Cyprus University
First author on one manuscript (Optics Express), graduated with honors from HMS.

2001-2002 Tina Helg, Ph.D. Post-doctoral Associate, University of Texas, Austin Co-author
on one manuscript.

2001-2003 Masamichi Takano, M.D. Staff cardiologist, Nippon Medical School, Tokyo, Japan

Co-author on five manuscripts. First author on a book chapter (Handbook of Vulnerable Plaque).

2002-2007 Caroline Boudoux, Ph.D. Professor, Director of Laboratory of Optical Diagnosis, and Imaging, Polytechnique Montreal Co-author on seven manuscripts, three as first author.

2002-2007 Dvir Yelin, Ph.D. Associate Professor, Technion
Co-author on fourteen manuscripts, nine as first author, one publication in Nature.

2002-2007 Alyx Chau, B.S. Graduate Student, EECS, MIT
Co-author on four manuscripts, two as first author (JBO, Annals of Biomedical Engineering).

2002-2005 Briain MacNeill, M.D. Practicing Cardiologist, Galway Clinic
Co-author on five manuscripts, two as first author (JACC and J. Nuclear Cardiology).

2003-2005 Andy Yun, Ph.D. Professor, Harvard Medical School
Co-author on twenty-seven manuscripts, eight as first author, one publication in Nature Medicine.

2003-2006 Raymond Chan, Ph.D. Research Scientist, Philips Medical
Co-author on five manuscripts, one as first author (Optics Express).

2003-2007 Ronit Yelin, Ph.D. Research Scientist, Technion
Co-author on three manuscripts, one as first author (JBO).

2003-2008 Jason Motz, Ph.D. Research Scientist, Physical Sciences, Inc. Co-author on six manuscripts, one as first author (Optics Letters).

2003-2008 Seemantini Nadkarni, Ph.D. Associate Professor, Harvard Medical School Co-author on six manuscripts, five as first author, including Circulation and JACC.

2003-2009 Brian Goldberg, Ph.D. Principal Systems Engineer, Axsun Technologies Co-author on two manuscripts, one as first author (JBO).

2003- W. Matthew White, M.D. ENT Physician, NYU Langone
Co-author on four manuscripts.

2003- John Evans, M.D. Gastroenterologist, Ochsner Medical Center Co-author

on four manuscripts, two as first author.

2004-2008 Benjamin Vakoc, Ph.D. Associate Professor, Harvard Medical School Co-author

on nineteen manuscripts, four as first author.

2004-2009 William Oh, Ph.D. Associate Professor, Korea Advanced Institute of Science and Technology (KAIST) Co-author

on fifteen manuscripts, seven as first author.

2005-2007 Adrien Desjardins, Ph.D. Assistant Professor, University College, London Co-author

on thirteen manuscripts, four as first author.

2005- Alberto Bilenca, Ph.D. Scientist, Ben Gurion University Co-author on ten manuscripts, five as first author.

2005- Melissa Suter, Ph.D. Assistant Professor, Harvard Medical School

Co-author on five manuscripts, two as first author (Gastrointestinal Endoscopy). Recipient of NIH K99/R00 award.

2005-2008 Leilei Peng, Ph.D. Assistant Professor, University of Arizona

First author on two manuscripts (Optics Express and Optics Letters). Recipient of NIH K99/R00 award.

2006-2007 Aydogan Ozcan, Ph.D. Professor, UCLA

Co-author on six manuscripts, three as first author, including Nano Letters.

2006- Patrick Yachimski, M.D. Gastroenterologist, Vanderbilt Medical Center

2006- Lida P. Hariri, MD, Ph.D. Instructor in Pathology, Massachusetts General Hospital

Co-author on four manuscripts, all as first author.

2007-2009 Priyanka Jillela, Ph.D. Graduate Student, University of Arizona

Co-author on one manuscript.

2007-2008 Amneet Gulati, Ph.D. Graduate Research Student, MIT

2007-2008 Max Colice, Ph.D. Technology Specialist, Hamilton, Brook, Smith, and Reynolds

Co-author on one manuscript.

2007-2009 Lisa Bartlett Contract Analyst, Advisory Board Co.

Co-author on one manuscript.

2007-2017 Dong-Kyun Kang, Ph.D. Assistant Professor, University of Arizona

Co-author on eighteen manuscripts, eight as first author.

2007-2008 Michael Choma, M.D., Ph.D. Associate Professor, Yale University

Co-author on two manuscripts, both as first author.

2008-2008 Kendall Bate Undergraduate Student, New York University Established

SOPs for intracoronary OCT core lab.

2008-2010 Jing Yuan, Ph.D. Post-doctoral Associate, Huazhong University of Sci. & Tech. (HUST)

First author on one manuscript

2008-2012 Hongki Yoo, Ph.D. Assistant Professor, Hanyang University, Korea Co-author

eight manuscripts, two as first author

2008-2012 Linbo Liu, Ph.D. Assistant Professor Nanyang Technological University

Co-author on fourteen manuscripts, three as first author, including Nature Medicine.

2009-2010 Eman Namati, Ph.D. VP, Product Development NinePoint Medical Co-author

on five manuscripts.

2009-2011 Jacqueline Namati, Ph.D. Director Center Development, Center for Biomedical OCT Research

2009-2012 Parama Pal, Ph.D. Robert Bosch Centre for Cyber Physical Systems

2009- Atsushi Tanaka, M.D. Professor, Wakayama Medical University Co-author on ten manuscripts, two as first author.

2009-2015 Hao Wang, Ph.D. Associate, Chinese FDA
Co-author on eight manuscripts, one as first author

2009-2012 William Warger, Ph.D. Research Scientist, Thor Labs

Co-author on four manuscripts.

2010-2012 Christine Fleming, Ph.D. Associate Professor, Department of Electrical Engineering Columbia University Co-author on one manuscript as first author.

2010-2012 Emmanuel Coron, M.D. Ph.D. Associate Professor, University Hospital Nantes Co-author on four manuscripts, one as first author.

2010-2012 Simon Schlachter, Ph. D. Clinical Systems Engineer, NinePoint Medical Co-author on two manuscripts, one as first author.

2010-2013 Paulino Vacas Jacques, Ph. D.
Co-author on two manuscripts

2010- Michalina Gora, Ph. D. Assistant Research Professor, University of Strasbourg

Co-author on eight manuscripts, four as first author, including one paper in Nature Medicine and one in Gastroenterology.

2011- 2022 Li Li, Ph.D. Research Scientist, Massachusetts General Hospital

2011-2013 Ehsan Hamidi, Ph.D. Research Design Engineer, Intel Corp.

Co-author on four manuscripts.

2011-2012 Yaron Bromberg, Ph.D. Postdoctoral Fellow, Yale University
Co-author on two manuscripts.

2012-2013 Tzahi Grunzwig, Ph.D. Research Scientist, KLA Tencor Corp.

2012-2016 Ali Fard, Ph.D. Research Scientist, Zeiss
Co-author on five manuscripts, one as first author.

2012-2013 Dora Juan Juan Hu, Ph.D. Research Fellow, Imperial College

2012-2014 Nima Tabatabaei, Ph.D. Assistant Professor, York University
Co-author on five manuscripts, one as first author.

2012-2015 Kengyeh (Ken) Chu, Ph.D. Postdoctoral Fellow, Duke University Co-author on nine manuscripts, two as first author.

2012-2013 Huan Ma, Ph.D. Instructor, Nanyang Technological University

2012-2013 Tao Wu, Ph.D.
Co-author on six manuscripts.

2010-2012 Kevin Gallagher Graduate Student, Carnegie Mellon University
Co-author on five manuscripts

2010-2013 Lauren Kava, B.S. Medical Student, Wayne State School of Medicine Co-author on three manuscripts.

2011-2013 Eric Wilsterman, B.S. Graduate Student, University of Massachusetts (Worcester) Co-author on six manuscripts.

2011-2012 Bradford Diephuis, M.S. Medical Student, Harvard Medical School Co-author on three manuscripts.

2011-2013 Drew Carlton, B.S. Medical Student, Hofstra University
Co-author on one manuscript.

2013-2018 Kanwarpal Singh, Ph.D. Postdoctoral Fellow
Co-author on two manuscripts, one as first author

2013-2017 Timothy Ford, Ph.D. Senior Systems Engineer, Axsun Technologies Co-author on two manuscripts.

2013-2015 Giovanni Ughi, Ph.D. Principal Scientist, Genuity
Co-author on nine manuscripts, three as first author

2013-2014 Yu Nomura, M.D. Physician at Shonan Kamakura Hospital
Co-author on one manuscript

2010-2015 Carolin Unglert, Ph.D. Graduate Student at Harvard-MIT Health Sciences and Technology
Co-author on three manuscripts, two as first author

2010-2014 Egidijus Auksorius, Ph.D. Postdoctoral Fellow, INSERM
Co-author on two manuscripts, one as first author

2011-2014 Manabu Kashiwagi, M.D. Cardiologist at Wakayama Medical University
Co-author on two manuscripts, one as first author

2012-2014 Minkyu Kim, M.S. Graduate Research Student, Tokyo University
Co-author on four manuscripts, one as first author

2013-2014 Melissa Haskell, B.S. Graduate Student, Harvard Biophysics

2013-2016	Diana Mojahed, B.S.	Graduate Student, Columbia University
2013-2014	Elena Quijano, B.S.	Graduate Student at Boston University
2013-2014	Andrew Quinn, M.D.	Staff Pathologist, Texas Southwestern
2013-2014	Timothy Vogel, M.D.	Visiting Scientist, University of Cincinnati
2013-2014	Lara Wurster, M.S.	Graduate Student, Vienna

2014- Jing Dong, Ph.D. Postdoctoral Fellow
Co-author on one manuscript.

2014-2015 Christopher Garcia, M.D. Pathology Fellow

2014-2016 Edouard Gerbaud, M.D. Cardiologist, University of Bordeaux
Co-author on four manuscripts, one as first author.

2014-2019	Chia-Pin Liang, Ph.D.	Postdoctoral Fellow
2014-2019	Biwei Yin, Ph.D.	Postdoctoral Fellow

Co-author on three manuscripts, two as first author.

2014- Mohini Lutchman, Ph.D. Lecturer, Harvard Medical School

2015-2016	Dongyao Cui	Manager of Strategy Department at Country Garden, Nanyang Technological University Co-author

on five manuscripts, one as first author.

2015-2015	Sanaz Alali, Ph.D.	Senior Design Engineer, ASML
2015-2015	Wolfgang Trasischker, Ph.D.	Consultant, McKinsey & Company

2015-2016 Dukho Do, Ph.D. Postdoctoral Fellow
Co-author on one manuscript.

2015-2015	Sabrina Lohmann, B.S.	Graduate Student, University Lübeck
2015-2019	Barry Vuong, Ph.D.	Postdoctoral Fellow

2015- Kanwarpal Singh, Ph.D. Postdoctoral Fellow
Co-author on four manuscripts, two as first author.

2015-2017 Rohith Reddy, Ph.D. Assistant Professor, University of Texas, Houston Co-author on two manuscripts.

2016-2017 Yogesh Verma, Ph.D. Postdoctoral Fellow

2016-2019 Adel Zeidan, Ph.D. Postdoctoral Fellow

2016-2017 Marine Lachenal, B.S. Graduate Student

2016- Hannah Levardon, B.S. Graduate Student

2016-2017 Lucille Queneherve, M.D. Gastroenterologist, University of Nantes Medical Center Co-author on two manuscripts, one as first author.

2016-2023 Huimin Leung, Ph.D. Postdoctoral Fellow
Co-author on four manuscripts.

2016- David Otuya, Ph.D. Postdoctoral Fellow
Co-author on one manuscript, as first author.

2016-2019 Kensuki Nishimiya, M.D. Clinical Fellow
2016-2020 Zhonglie Piao, Ph.D. Postdoctoral Fellow 2016-2018 Gargi Sharma, Ph.D. Postdoctoral Fellow
Co-author on two manuscripts.

2016-2017 Elham Abouei Exchange Student – Ph.D. student at
2019-2021 University of British Columbia

2017-2018 Hany Osman, M.D. Clinical Fellow

2017-2018 Omair Shakil, M.D. Clinical Fellow

2017-2019 Anna Kimchenko, Ph.D. Postdoctoral Fellow

2017-2018	Susan Yoon, B.S.	Graduate Student
2017-2021	Jiheun Ryu, Ph.D.	Postdoctoral Fellow

Co-author on two manuscripts.

2017-2018	Xiupin Wu, B.S.	Graduate Student
2018- 2022	Osman Ahsen, Ph.D.	Postdoctoral Fellow
2018- 2022	Chukwuemeka Okoro, Ph.D.	Postdoctoral Fellow
2018-2021	Andreas Wartak, Ph.D.	Postdoctoral Fellow
2019-2021	Verena Buehler	Student Intern – Graduate student at the University of Lubeck's Medical Engineering program
2019-2020	Chaoliang Chen, Ph.D.	Postdoctoral Fellow
2019-	Evangelia Gavgiotaki, Ph.D.	Postdoctoral Fellow
2019-2021	Victoria Gonzalez	Student Intern – High School Part Time Research Assistant
2019-2020	Girish Gududappanavar, Ph.D.	Postdoctoral Fellow
2019-	Fang Hou, Ph.D.	Postdoctoral Fellow
2019-2020	Justin Kim	Student Intern – High School
2019-	Du-Ri Song, Ph.D.	Postdoctoral Fellow
2019-2021	Graham Spicer, Ph.D.	Postdoctoral Fellow
2020-2024	Junyoung Kim, Ph.D.	Postdoctoral Fellow
2020-	Daniel Magley	Student Intern – Graduate student at Harvard-MIT Health Sciences and Technology (HST) program
2020-2021	Weiye Song, Ph.D.	Postdoctoral Fellow
2020- 2022	Linhui Yu, Ph.D.	Postdoctoral Fellow

2020-2021	Dan Rolando Lopez, MD	IVM Postdoctoral Research Fellow
2020-	Srihari Kumar Lella, MD	Clinical Fellow (Vascular Surgery)
2020-2021	Thomas Jonathan Sherman King	Student Intern – High School
2020-2021		John McDaniel Undergraduate Student Intern (Coop)
2020-2021	Sohaib Ashraf, MD	Postdoctoral Research Fellow
2020-2022	Conor Sheil, Ph.D.	Postdoctoral Research Fellow (OCT)
2021-2021	Daniel Solomon	Undergraduate Student Intern
2021-2022	Pantea Tavakolian, Ph.D	Postdoctoral Research Fellow
2021-2021	Maya Modi	Undergraduate Student Intern
2021-2024	Andrew Thrapp, Ph.D	Graduate Research Assistant Postdoctoral Research Fellow
2021-2023	Radhika Poduval	Postdoctoral Research Fellow
2021-2022	Santosh Balakrishnan, Ph.D.	Postdoctoral Research Fellow
2022-	Madelyn Hoying	Graduate Student, Massachusetts Institute of Technology (MIT)
2022-2022	Sean D' Mello	Undergraduate Research Assistant
2022-	Jintaek Im	Graduate Student, Daegu Gyeongbuk Institute of Science and Technology
2022-	Hinnerk Schulz Hilderbrandt, Ph.D	Instructor in Investigation
2022-2023	Tiffany Miller, MD	Research Fellow
2023-	Huijuan Zhang, Ph.D	Research Fellow

2023-	Philipp Rauschendorfer, Ph.D	Research Fellow
2023-2024	Asemare Mengistie, PhD	Research Fellow
2023-	Praveenbalaji Rajendran, PhD	Research Fellow
2023-	Huijuan Zhang, Ph.D	Research Fellow
2024-	Milana Kendrisic, PhD	Research Fellow

Formal Teaching of Peers (e.g., CME and other continuing education courses)

2000-2001	Endoscopic Management of Tumors of the Upper Aerodigestive Tract	
2002	Clinical Applications of Optical Coherence	Partners Health Care Tomography
2003	Thrombosis and Thromboembolism: New Strategies for Improved Patient Care	Partners Health Care
2013	Imaging the Vulnerable Plaque	Partners Health Care
2013	Quantitative Medicine	Massachusetts General Hospital
2014	Translational Cardiovascular Research	Harvard Catalyst
2014	Medical Device Development	Harvard Catalyst
2014	In-vivo Microscopy	College of American Pathologists
2014	Frontiers in Medicine	Harvard-MIT Health Sciences and Technology
2015-	Introduction to IVM: Interpretation for Pathologists	College of American Pathologists

Local Invited Presentations

Professor Tearney has presented over 100 local invited presentations.

Report of Regional, National and International Invited Teaching and Presentations

Professor Tearney has presented over 500 local, regional, national and international talks.

Report of Clinical Activities and Innovations

Current Licensure and Certification

2001- Board Certification, Anatomic Pathology

Practice Activities

Since completing his residency in 2001, Dr. Tearney has devoted 100% effort to research.

Report of Technological and Other Scientific Innovations

Greater than 700 patents filed, and over 100 US patents issued.

Report of Scholarship

Peer-Reviewed Publications in print or other media

Research Investigations

1. Kenet RO, Herrold EM, Hill JP, Wong KK, **Tearney GJ**, Borer JS. Coronary luminal morphology: Reconstruction from digital angiograms. American Journal Cardiac Imaging 1990;4:11-19.

2. Bouma BE, **Tearney GJ**, Boppart SA, Hee MR, Brezinski ME, Fujimoto JG. High resolution optical coherence tomographic imaging using a mode locked Ti:Al2O3 laser. Optics Letters 1995;20:148688.

3. Fujimoto JG, Brezinski ME, **Tearney GJ**, Boppart SA, Bouma BE, Hee MR, Southern JF, Swanson EA. Biomedical imaging and optical biopsy using optical coherence tomography. Nature Medicine 1995;1:970-72.

4. **Tearney GJ**, Brezinski ME, Southern JF, Bouma BE, Hee MR, Fujimoto JG. Determination of the refractive index of highly scattering human tissue by optical coherence tomography. Optics Letters 1995;20:2258-60.

5. Boppart SA, Brezinski ME, Bouma BE, **Tearney GJ**, Fujimoto JG. Investigation of developing embryonic morphology using optical coherence tomography. Developmental Biology 1996;177:5463.

6. Boppart SA, Bouma BE, Brezinski ME, **Tearney GJ**, Fujimoto JG. Imaging developing neural morphology using optical coherence tomography. Journal of Neuroscience Methods 1996;70:65-72.

7. Bouma BE, **Tearney GJ**, Bilinsky IP, Golubovic B, Fujimoto JG. A self-phase-modulated Kerrlens-modelocked Cr:forsterite laser source for optical coherence tomography. Optics Letters 1996;21:1839-41.

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Letters to the Editor

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Rekhter M, Rumberger J, Russell M, Schwartz R, Selwyn A, Strauss HW, **Tearney GJ**, Tomaru T, Tuzcu EM, Wasserman B. Thoughts on the role of the healing professions and the events of September 11, 2001. Circulation. 2002;105:1509-10.

2. **Tearney GJ**, Yabushita H, Houser SL, Aretz HT, Jang IK, Schlendorf KH, Kauffman CR, Shishkov M, Halpern EF, Bouma BE. Thermography to detect inflamed macrophage-rich plaques - Response. Circulation 2003;107:e112-13.

Thesis

1. **Tearney GJ**. Optical characterization of human tissues using low coherence interferometry [Master's dissertation]. Cambridge (MA): Massachusetts Institute of Technology; 1995.

2. **Tearney GJ**. Optical biopsy of in vivo tissue using optical coherence tomography [Doctoral dissertation]. Cambridge (MA): Massachusetts Institute of Technology; 1997.

3. **Tearney GJ**. Spectral encoding for confocal microscopy [MD honors dissertation]. Boston (MA): Harvard Medical School; 1998.

Abstracts, Poster Presentations and Exhibits Presented at Professional Meetings: (Over 500 abstracts presented at scientific meetings)

Narrative Report

My research interests are primarily focused on the development and validation of non-invasive, highresolution optical imaging methods for disease diagnosis. I have conducted research to develop and establish a new imaging modality, termed "optical coherence tomography" (OCT), which provides crosssectional images of tissue architectural microstructure at a resolution of 10 μm. I was the first to perform human imaging in the coronary arteries and gastrointestinal tract with this method, and my laboratory has imaged over 1000 patients to date. We have also recently developed a capsule that once swallowed, grabs three-dimensional microscopic images of the entire upper gastrointestinal tract. Additionally, I have developed a form of endoscopic confocal microscopy that can obtain images of entire luminal organs at a resolution of 1.0 μm. Images obtained by OCT and endoscopic confocal microscopy may be used to guide biopsies during screening procedures and may potentially allow for primary diagnosis at tissue sites where excisional biopsies are difficult to obtain. In my work, I have developed many other technologies, including an ultraminiature three-dimensional endoscope, a highly efficient form of near field scanning optical microscopy (NSOM), and other novel fluorescence spectroscopy and imaging techniques. I have successfully transitioned many of my inventions into the commercial sector.

My training as a pathologist has complemented my research by providing a foundation for the interpretation of images obtained by these new, non-invasive diagnostic modalities. During my research tenure, I have formed many collaborations within the Massachusetts General Hospital (MGH). These collaborations involve pathologists, clinicians, physicists, and engineers and include clinical studies in the fields of Gastroenterology, Cardiology, Pulmonology, and Otolaryngology. My work extends beyond MGH, as I currently direct multicenter, national, and international clinical studies to validate technologies developed in my laboratory. In addition, I have recently founded the International Working Group on Intracoronary OCT Standardization and Validation and the CAP In Vivo Microscopy Committee, groups that are dedicated to ensuring the widespread adoption of these imaging technologies.

With respect to teaching, I have actively participated in the development of a program to increase graduate student participation at the Wellman Center for Photomedicine. I have supervised Ph.D. theses research of

many graduate students and have supervised M.D. honors theses conducted by Harvard Medical School students. Additionally, I helped found the graduate course on biomedical optics at MIT in the HST program (HST .569), was a co-director for the HST Human Pathology course (HST .035) and am a lecturer for the Wellman Biomedical Optics Summer Program. I also teach on the national level, including CME courses, training courses for interpreting optical images, and numerous presentations to the lay public relating the benefits of our imaging technology to health care.