



Curriculum Vitae

Graeme F. Woodworth, M.D., FAANS, FACS
Professor and Chair, Department of Neurosurgery
Director, Brain Tumor Program
Co-Director, Neuroscience Network
University of Maryland

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Contact Information

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Education

1997 B.S., Chemistry (major), Economics (minor), Tufts University
2005 M.D., Johns Hopkins University School of Medicine

Post Graduate Education and Training

2005-2006 *Intern*, Department of Surgery, Johns Hopkins Hospital, Baltimore, Maryland
2006-2011 *Resident*, Department of Neurosurgery, Johns Hopkins Hospital, Baltimore, Maryland
2009-2011 *Fellow*, Neuro-Oncology-NCI/Nanotechnology for Cancer Medicine Program, Johns Hopkins University School of Medicine, Baltimore, Maryland
2011 *Fellow*, Cranial Neuro-Endoscopy, Department of Neurological Surgery, Weill Cornell School of Medicine, New York, New York
2011-2012 *Assistant Chief of Service*, Department of Neurosurgery, Johns Hopkins Hospital, Baltimore, Maryland

Professional Licensure and Board Certification

2009 *Medical license, Maryland (active)*
2010 *Medical license, New York (inactive)*
2015 *Diplomate, American Board of Neurological Surgery*

Other Certification

2010 *Cyberknife Stereotactic Radiosurgery*
2012-present *Basic Life Support, American Red Cross*
2015 *Fellow, American Association of Neurological Surgeons*
2016 *Fellow, American College of Surgeons*
2019 *Gamma Knife Stereotactic Radiosurgery*

Employment History

Academic Appointments

2012-2015 *Assistant Professor, Department of Neurosurgery, University of Maryland School of Medicine*
2013-2015 *Assistant Professor (secondary), Department of Anatomy and Neurobiology, University of Maryland School of Medicine*
2013-present *Graduate Faculty, University of Maryland, Baltimore Graduate School*
2013-2021 *Adjunct Faculty, Department of Neurosurgery, Johns Hopkins Department of Neurosurgery*
2014-2015 *Assistant Professor (secondary), Department of Diagnostic Radiology and Nuclear Medicine, University of Maryland School of Medicine*
2015-2018 *Associate Professor, Department of Neurosurgery, University of Maryland School of Medicine*
2015-2018 *Associate Professor (secondary), Department of Anatomy and Neurobiology, University of Maryland School of Medicine*
2015-2018 *Associate Professor (secondary), Department of Diagnostic Radiology and Nuclear Medicine, University of Maryland School of Medicine*
2016-present *Director, Brain Tumor Program, Greenebaum Comprehensive Cancer Center, University of Maryland*
2018-present *Professor, Department of Neurosurgery, University of Maryland School of Medicine*
2018-present *Professor (secondary), Department of Neurobiology, University of Maryland School of Medicine*
2018-present *Professor (secondary), Department of Diagnostic Radiology and Nuclear Medicine, University of Maryland School of Medicine*
2019-2020 *Interim Chair, Department of Neurosurgery, University of Maryland School of Medicine*
2020-present *Chair, Department of Neurosurgery, University of Maryland School of Medicine*

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2021-present *Professor (adjunct), Fischell Department of Bioengineering, University of Maryland, College Park*

Other Employment & Appointments

1997-1999 *Assistant Scientist, Pfizer, Inc., Discovery Chemistry Division- Central Research, Groton, Connecticut*

2000-2001 *Research Associate, University of California San Francisco, Gladstone Institute of Virology and Immunology, San Francisco, California*

2009-2011 *Contract Physician, Surgical Intensive Care Unit, Department of Anesthesiology and Critical Care Medicine, Johns Hopkins Hospital, Baltimore, Maryland*

2009-2011 *Contract Physician, Department of Neurosurgery, Sinai Hospital, Baltimore, Maryland*

2012-present *Attending Neurosurgeon, University of Maryland Hospital and Shock Trauma Center, Baltimore, Maryland*

2012-present *Attending Neurosurgeon, Baltimore Veterans Affairs Medical Center, Baltimore, Maryland*

2013-present *Unaffiliated Neurotrauma Consultant, National Football League*

2015-present *Attending Neurosurgeon, University of Maryland St. Joseph's Medical Center*

2019-present *President, University of Maryland Neurosurgical Associates*

2020-present *Neurosurgeon-in-Chief, University of Maryland Medical Center*

2021-present *Executive Co-Director and Founder, Neuroscience Network, University of Maryland Medical System*

2023-present *President, University of Maryland Ambulatory Surgery Center, Columbia, MD*

2024-present *Attending Neurosurgeon, University of Maryland Baltimore-Washington Medical Center*

2024-present *Director, University of Maryland Faculty Practice Enterprises*

Professional Society and Memberships

2005-present *American Association of Neurological Surgeons (AANS)*

2005-2016 *Congress of Neurological Surgeons (CNS)*

2015-present *American College of Surgeons*

2013-present *AANS Section on Tumors*

2010-2012 *Cyberknife Society*

2012-present *North American Skull Base Society*

2012-present *Focused Ultrasound Foundation*

2012-present *Society for Neuro-Oncology*

2021-present *American Academy of Neurological Surgeons*

2025-present *American Society for Clinical Investigation*

Honors and Awards

1997 *Cum Laude, Department of Chemistry, Tufts University*

1997 *Robert M. Allan Sr. Award, Intercollegiate Sailing Association*

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- 2001 *Above and Beyond Award*, The Gladstone Institute/UCSF, San Francisco, California
- 2004 *Clinical Research Award*, Southern Society of Neurological Surgery
- 2004 *Medical Student Research Award*, Alpha Omega Alpha Honors Society
- 2004 *B. Wood Research Award*, Johns Hopkins School of Medicine
- 2007 *Patient Safety Research Award*, Johns Hopkins Department of Neurosurgery
- 2009 *T32 Award*, Nanotechnology in Cancer Medicine, Johns Hopkins University
- 2010 *Chairman's Award for Patient Safety Research*, Johns Hopkins Department of Neurosurgery
- 2011 *Harvey Cushing Research Award*, Johns Hopkins Department of Neurosurgery
- 2012 *Neurosurgeon Research Career Development Program Award*, Massachusetts General Hospital/NINDS
- 2013 *Clinician-Scientist Award*, The Passano Foundation
- 2014 *Dean's Challenge Award*, University of Maryland School of Medicine
- 2014 *Pilot Research Award*, University of Maryland Greenebaum NCI Cancer Center
- 2015 *Innovation in Biotechnology Award*, (co-awardee) American Association of Pharmaceutical Scientists and Genentech
- 2015 *Jorge Heller Outstanding Paper Award*, (co-award) Controlled Release Society
- 2016 *Research Scholar Award*, American Cancer Society
- 2017 *Pilot Research Award*, University of Maryland Greenebaum Comprehensive Cancer Center
- 2018 *Accelerated Translational Project Award*, Institute for Clinical and Translational Research, University of Maryland School of Medicine
- 2018 *University of Maryland Research and Innovation Award – M-Power Program*
- 2019 *Andrew J. Lockhart Memorial Prize*, Focused Ultrasound Foundation
- 2019-23 *Top Docs*, Baltimore Magazine
- 2022 *Alumni Achievement Award*, Johns Hopkins University, Department of Neurosurgery
- 2022 *Ferenc Jolesz Memorial Award*, Focused Ultrasound Foundation
- 2023 *Howard M. Eisenberg Distinguished Professor of Neurosurgery*, University of Maryland School of Medicine
- 2025 *Elected member*, American Society for Clinical Investigation

Clinical Activities

The Neurosurgery Service provides 24/7/365 coverage for the University of Maryland Hospital (UMH), Shock Trauma Center (STC), and the Baltimore VA Medical Center (BVAMC). Neurosurgery Residents rotate through a preset curriculum and schedule with this Service over a seven-year period. As a neurosurgery faculty member, the general coverage scheme includes: 5 days/week, 1 in 7 weekends/month, 1 in 7 week nights/week throughout each calendar year, with oversight and teaching of 1 chief resident (UMH), 1 senior resident (BVAMC/STC), and 2 junior residents (UMH/BVAMC/STC). Currently, there are 14 residents in the Neurosurgery Program.

- 2012-present *Attending Neurosurgeon*, Department of Neurosurgery, University of Maryland Medical Center
 - Inpatient service oversight and teaching: 1 chief resident (UMH), 1 senior resident (VA/STC), 2 junior residents (UMH/VA/STC)
 - Operative oversight and teaching: 6-10 hours/day, 2 days/week

- Clinical service coverage: 1 in 7 weekends/month, 1 in 7 week nights/week throughout each year.
- 2016-present *Director*, Brain Tumor Program, Greenebaum Comprehensive Cancer Center
- Consultative and surgical services for brain and spinal tumor patients 5/7 days/week, 3/7 weekends/months (see also description below).
 - Program leadership in clinical trials development, faculty recruitment, and patient outreach and support (see activities description below)
- 7/1/19-present *Neurosurgeon-in-Chief*, University of Maryland Medical Center
- Administrative and leadership services for the University and Shock Trauma hospitals
 - Integrating system hospitals to improve patient safety, quality of care, resource utilization, and transfer efficiency. Developing the University of Maryland Neuroscience Network as a central coordinating organization for these efforts. Developing patient access and tele-consult services across 12+ UMMS members sites.
 - Coordinating Performance Improvement program for perioperative and related patient care services
 - Developed the first **Joint Performance Program** linking data and safety and quality-based incentives across hospital and clinical services

Neurosurgery trainees:

- 2012-2013 Chris Maulucci, M.D., *Resident*, UM Department of Neurosurgery
Current Position: Vice Chair of Clinical Neurological Surgery, Director of the Neurosurgery Spine Program, Assistant Residency Program Director, Department of Neurosurgery, Tulane University
- 2012-2013 David Chessler, M.D., Ph.D., *Resident*, UM Department of Neurosurgery.
Current Position: Faculty, Department of Neurosurgery, Stony Brook University
- 2012-2014 Gary Schwartzbauer, *Resident*, UM Department of Neurosurgery,
Current Position: Associate Professor and Director of Neurotrauma, Departments of Neurosurgery and Critical Care Medicine - Shock Trauma Center, University of Maryland, Baltimore, MD
- 2012-2014 Adam Polifka, M.D., *Resident*, UM Department of Neurosurgery,
Current Position: Associate Professor and Program Director, Department of Neurosurgery, University of Florida, Gainesville, FL
- 2012-2015 Justin Slavin, M.D. *Resident*, UM Department of Neurosurgery,
Current Position: Centers for Neurosurgery, Spine & Orthopedics, Wayne, NJ
- 2012-2016 Kenneth Crandal, M.D., *Resident*, UM Department of Neurosurgery,
Current Position: Associate Professor, Department of Neurosurgery, University of Maryland, Baltimore, MD
- 2012-2016 Narlin Beatty, M.D., *Resident*, UM Department of Neurosurgery,
Current Position: Neurosurgeon, Tallahassee Neurological Clinic, Tallahassee, FL
- 2012-2017 Akil Patel, M.D., *Resident*, UM Department of Neurosurgery,

2012-2017	<u>Current Position:</u> Neurosurgeon, KPN Brain & Spine, Kettering, OH Evan Lewis, M.D., <i>Resident</i> , UM Department of Neurosurgery,
2012-2018	<u>Current Position:</u> Neurosurgeon, Andrews Institute, Pensacola, FL Elizabeth Le, M.D., <i>Resident</i> , UM Department of Neurosurgery <u>Current Position:</u> <i>Assistant Professor</i> , University of Alabama, Birmingham, AL
2012-2018	David Hersh, M.D., <i>Resident</i> , UM Department of Neurosurgery <u>Current Position:</u> <i>Associate Professor</i> , Division of Neurosurgery, University of Connecticut School of Medicine, Hartford, CT
2013-2019	Salazar Jones, M.D., <i>Resident</i> , UM Department of Neurosurgery <u>Current Position:</u> <i>Assistant Professor</i> , Department of Neurosurgery, Mount Sinai School of Medicine, New York, NY
2013-2019	Erik Hayman, M.D., <i>Resident</i> , UM Department of Neurosurgery <u>Current Position:</u> <i>Assistant Professor</i> , College of Medicine Neurosurgery, University of South Florida, Tampa, FL
2014-2020	Harry Mushlin, M.D., <i>Resident</i> , UM Department of Neurosurgery. <u>Current Position:</u> <i>Assistant Professor</i> , Department of Neurosurgery, Stony Brook University
2014-2020	Matthew Kole, M.D., <i>Resident</i> , UM Department of Neurosurgery. <u>Current Position:</u> <i>Faculty</i> , Geisinger Neuroscience Institute, Danville, PA
2015-2021	Aaron Wessell, M.D., <i>Resident</i> , UM Department of Neurosurgery. <u>Current Position:</u> <i>Neurosurgeon</i> , Sentara Neurosurgery Specialists, Norfolk, VA
2015-2021	Nathan Pratt, M.D., <i>Resident</i> , UM Department of Neurosurgery. <u>Current Position:</u> <i>Assistant Professor</i> , University of Texas Medical Branch, Department of Neurosurgery, Galveston, TX
2016-2022	Gregory Cannarsa, M.D., <i>Resident</i> , UM Department of Neurosurgery. <u>Current Position:</u> Neurosurgeon, Apex Brain and Spine, Naples, FL
2016-2022	Timothy Chyrissikos, M.D., Ph.D., <i>Resident</i> , UM Department of Neurosurgery. <u>Current Position:</u> <i>Assistant Professor</i> , University of Maryland, Baltimore, MD
2017-2023	Nicholas Caffes, M.D., <i>Resident</i> , UM Department of Neurosurgery <u>Current Position:</u> <i>Neurosurgeon</i> , Wellspan Health System, York, PA
2017-2023	Jeffrey Oliver, M.D., <i>Resident</i> , UM Department of Neurosurgery. <i>Cerebrovascular Fellow</i> , Geisinger Neuroscience Institute, Danville, PA
2018-2024	Ashish Sharma, M.D., <i>Resident</i> , UM Department of Neurosurgery, <u>Current Position:</u> Attending Neurosurgeon, Phoenix, AZ (Barrow Neurological Institute affiliate)
2018-2024	Nathan Han, MD, <i>Resident</i> , UM Department of Neurosurgery, <u>Current Position:</u> <i>Spine Fellow</i> , UCSF
2019-present	Joshua Olexa, MD, APEX Resident and CAST Spine Fellow, UM Department of Neurosurgery

Administrative Service

Institutional Service

2012-2018	<i>Chair</i> , Quality Assurance Committee, Department of Neurosurgery, University of Maryland School of Medicine
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- Quarterly planning and committee meetings (4-8 hours per quarter)
 - Developed multidisciplinary care rounds for inpatient Neurosurgery Service
 - Assisted in establishing mid-level provider team for Neurosurgery Service
 - Working to improve Acute Care Neurosurgical floor layout and environment
 - Developed early mobilization and discharge planning system
 - Developed multi-modal pain management protocol for post-operative patients to reduce use of narcotics
- 2013-present *Director of Neurosurgical Oncology*, Department of Neurosurgery, University of Maryland School of Medicine
- Lead neurosurgical component of weekly multi-disciplinary brain tumor conference (1-2 hours per week)
 - Lead the monthly 'Pituitary and Skull Base' tumor multi-disciplinary conference (1-2 hour per month)
 - Developed 'awake craniotomy' brain surgery team including anesthesiology team and neurophysiological monitoring
 - Developed "fluorescence guided brain tumor surgery including fluorescein and 5-Ala based approaches at UMMC
 - Developed 'laser interstitial thermotherapy (LITT) brain tumor surgery including setup and optimization of Monteris system at UMMC
- 2013-present *Co-director*, Translational Therapeutics Research Group, Greenebaum Cancer Center and Department of Neurosurgery, University of Maryland School of Medicine
- Developing targeted therapeutics for cancer therapy (brain, breast, lung) with a multi-disciplinary team of engineers, cancer biologists, and physician scientists
 - Developing genetically engineered glioma models
 - Investigating MR-guided focused ultrasound for brain cancer
 - Collaborating with leading scientists at MD Anderson Cancer Center, Fred Hutchinson Cancer Center, Johns Hopkins University, Mayo Clinic, Duke University, Translational Genomics Research Institute, University of North Carolina, Mayo Clinic, Dana Farber Cancer Institute
- 2013-2017 Judge, Medical Student Summer Research Program (4 hours per summer session)
- 2013-2015 NeuroCritical Care Review Committee (1-2 hours per month)
- 2014-2024 *Co-director*, Center for Metabolic Imaging and Therapeutics (CMIT), University of Maryland School of Medicine
- Co-investigator, Focused Ultrasound Essential Tremor Phase III clinical trial
 - Developed pre-clinical MR-guided focused ultrasound for blood brain barrier disruption and interstitial brain effects
 - Principle Investigator, MRgFUS blood brain barrier disruption trials in glioblastoma patients

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- Developed hyper-polarized MRI clinical trial for imaging primary and current glioblastoma
- 2014-present Nathan Schnaper Summer Intern Program in Cancer Research Selection Committee
- 2014-2015 Neurosurgery Mid-level Provider Search Committee (2 hours per week)
- 2014-2020 NIH T32 Cancer Biology Training Grant Selection Committee
- 2015-present *Interviewer*, University of Maryland School of Medicine Admissions Committee
- 2016-2021 Passano Foundation-University of Maryland Clinician-Scientist Award Selection Committee
- 2016-present *Director*, Brain Tumor Program, Greenebaum Comprehensive Cancer Center
 - Leading faculty searches, recruitments, and program development efforts with Cancer Center Director (KC) and Neurology Chair (PC) for medical neuro-oncologists and brain cancer scientists
 - Successful recruitment of Haroon Ahmad, M.D. – Neuro-oncology, University of Virginia
 - Successful recruitment of Lilly Pham, M.D. – Neuro-oncology, MD Anderson Cancer Center
 - Leading search and recruitment efforts) for Neuropathology scientists and clinician scientists
 - Successful recruitment of Cherry Ho, MD., PhD., Assistant Professor, Children’s National Medical Center
 - Successful recruitment of Heather Ames, M.D., Ph.D., Post-doctoral Fellow, Neuropathology, Johns Hopkins Hospital
 - Successful recruitment of Eli Bar, Ph.D., Assistant Professor, Case Western Reserve University
 - Successful recruitment of Nima Sharafai, M.D., Ph.D neuro-pathology clinical fellow, Emory University
 - Establishing clinical and research endowments (see Philanthropy section below)
 - Working to integrate clinical and research efforts across Neurosurgery (G. Woodworth, H. Eisenberg, A Ksendzovsky), Radiation Oncology (W.Regine, M.Mishra) Radiology (E. Melhem, P. Raghavan, R Gullapalli), Neurology (P.Crino), Cancer Center (H. Ahmad, K. Cullen, J. Winkles), Pathology (C. Ho, H. Ames, S. Stass), Institute for Genome Sciences (S. Devine)
- 2017-present Center for Innovative Biomedical Resources (CIBR) Advisory Committee
- 2018-present UMMC Operating Room Committee – block review and redistribution, OR efficiency including start times, turnaround times, surgical team establishment
- 2019 Search Committee, Department of Surgery Chair, UMSOM. Successful recruitment of Christine Lau, MD, PhD (UVA Health).

- 2019 Review Committee, Department of Otolaryngology Head and Neck Surgery Chair, UMSOM. Successful review and retention Rod Taylor, MD
- 2019 Search Committee, Director of the Program in Transplantation, UMSOM. Successful recruitment Daniel Maluf, MD (UTenn)
- 7/1/19-present *Chair*, Department of Neurosurgery, University of Maryland School of Medicine
- Restructuring Neuro-Interventional service with Departments of Radiology (E. Melhem) and Neurology (P.Crino)
 - Re-negotiating new neurosurgery department contracts with University of Maryland Medical Center, Baltimore VA Medical Center
 - Designed and implemented the first ‘fund flow’ model between UMMC and the Department of Neurosurgery
 - Budget management consisting of approximately \$28 million in net clinical and research operating revenues, including 8 NIH-funded research laboratories.
 - Developing a University system-wide strategy for integrating the missions and expertise of 12 system medical centers and hospitals
 - Implementing the Enterprise Operating System (EOS) into the departmental organization, through consultation and partnership with Blue Core Leadership, Randall Taussig
- 2020 *Chair*, Search Committee for the Chair and Department of Anatomy & Neurobiology, University of Maryland School of Medicine. Successful recruitment and retention of Asaf Keller, PhD.
- 2020-2023 Clinical Affairs Committee, Faculty Physicians Inc., UMSOM
- 2021-present *Co-director and Founder*, University of Maryland Neuroscience Network
- Founded and implemented the ‘network concept’ within UMMS, negotiated agreements with member organizations, with Peter Crino, MD, PhD (co-director and chair of Neurology)
 - UMMS, in partnership with the University of Maryland School of Medicine departments of Neurology and Neurosurgery, identified neurosciences care as a significant opportunity to enhance services to communities served by implementing a consistent, system-wide, high quality, value-based neurological and neurosurgical patient care model at all member organizations and a network that features creating access to time-sensitive care (“right care, right setting”) leveraging the respective neurosciences expertise and capabilities of all UMMS member organizations and the School of Medicine Departments of Neurology and Neurosurgery.
 - Key UMNN principles include:
 - Commitment to innovation in patient care and healthcare operations and systems.
 - Dedication towards the highest level of patient centered neurological care—delivered with care and compassion.
 - Provide clinical care across UMNN that achieves parity in approach, delivery, and quality reflecting, following, and adhering

- to standards-of-care nationally in all areas of neurological and neurosurgical care (e.g., cerebrovascular/stroke, epilepsy, brain tumor, spine, and other neurological disorders).
- Create and maintain high performing health care teams across all UMMS member organizations to deliver high quality and cost effectiveness care.
 - Align and integrate regional programs to get the ‘right patients to the right (appropriately resourced) places, thereby improving the efficiency of care within the system, at an overall lower cost and with utmost importance on achieving optimal patient outcomes.
 - Develop a system-wide leadership structure that guides all neurosciences-related clinical program development activities at UMMS member organizations.
- 2022-present *Chair*, Business Development and Strategic Alignment Committee, University of Maryland Faculty Practice
- Developing practice/department realignment playbooks (principles and guidelines) for operational and financial consistency and benchmarking.
 - Creating a strategic plan for SOM/UMMC group practice facilities in the Maryland/DC region
- 2023 *Chair*, Search Committee for the Director of the Greenebaum Comprehensive Cancer Center, University of Maryland School of Medicine. Successful recruitment of Taofeek Owonikoko, MD, PhD, (UPMC)
- 2022-present *President*, UM-Medicine Ambulatory Surgery Center, restructuring existing ASC operation, partnering with operations company (SCA), resetting payer contracts, establishing surgeon alignment model.
- 2024 *Physician Lead*, Contract re-negotiation with CareFirst Blue Cross Blue Shield. Developed alliance model with the primary commercial payer for the UM-Faculty Practices, resetting the rate structure and reimbursement system based on value rather than volume (fee for service) definitions. Created a total-cost-of-care alignment strategy through enhanced data and predictive analytics, non-hospital and in-hospital performance improvement.
- 2024-present *Director*, University of Maryland Faculty Practice Enterprises. Leading the first for-profit entity within the Faculty Practice, integrating aligned private groups with the Faculty and Departments
- 2024 *Co-chair*, Search Committee for the Chair of the Department of Medicine, UMSOM

Local Service

- 2002-2005 *Co-founder*, Johns Hopkins Student OUtreach Resource Center (SOURCE: source.jhu.edu), received AOA Community Service Grant, 2004

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- 2008-2012 Educational Committee, Johns Hopkins University Department of Neurosurgery
- 2008-2010 Information Technology Committee, Provider Order Entry/Eclipsys Platform Development, Johns Hopkins University Department of Neurosurgery
- 2013-2018 Scientific Advisory Committee, Nanotechnology in Cancer Medicine T32 program, Johns Hopkins University
- 2014-2022 Scientific Advisory Committee, Cancer Biology T32 program, University of Maryland School of Medicine
- 2022-present University of Maryland BIOPARK development team

National & International Service

- 2007-2011 Young Neurosurgeon's Committee, American Association of Neurological Surgeons
- 2010-2011 Member Benefits Development Committee, American Association of Neurological Surgeons
- 2012-present Ad Hoc Reviewer: *Clinical Cancer Research*, *Nature Nanotechnology*, *Journal of Neuro-Oncology*, *Neuro-oncology*, *Neurosurgery*, *Journal of Controlled Release*, *Journal of Biomedical Materials Research*, *International Journal of Nanomedicine*, *Oncotarget*, *PLOS ONE*, *Advanced Materials Research*, *Nanomedicine*, *Theragnostics*, *BMC Genomics*, *Scientific Reports*, *BMC Cancer*, *Nature Communications*, *Clinical Cancer Research*
- 2012-2014 Life-Long Learning Committee, Congress of Neurological Surgeons
- 2012-present Scientific Advisory Committee, Focused Ultrasound Foundation
- 2018-2020 DSMB, ABTC 1401
- 2018-present Neuro-Oncology Advisory Board, InSightec Inc.
- 2019-2022 Society for Image-Guided Neuro-interventions (SIGN), Annual Meeting organizing committee
- 2021 *Detecting, Mapping, and Quantifying Bubble Activity in Therapeutic Ultrasound*, Focused Ultrasound Foundation - American Institute of Ultrasound in Medicine's Future Fund Workshop Series, 2021
- 2022-present Scientific Advisory Board, SonALAsense, Inc.
- 2022-present Scientific Advisory Board, Therillum, Inc.
- 2022-present Scientific Advisory Board, Port Therapeutics, Inc.
- 2023 Society of Neuro-Oncology, Focused Ultrasound Seminar, Vancouver, BC
- 2024 Focused Ultrasound Foundation, Blood Brain Barrier symposium, Alexandria, VA

Grant and Program Review

- 2012-present Focused Ultrasound Foundation
- 2014-present Nathan Schnaper Summer Intern Program in Cancer Research
- 2014-2021 NIH T32 Cancer Biology Training Program, University of Maryland School of Medicine
- 2016-2020 Passano Foundation

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2016-2020	American Cancer Society - Institutional Research Grant Program, University of Maryland
2017-2019	Cigarette Restitution Fund, State of Maryland and Greenebaum Cancer Center
2018-2021 2019	Institute for Clinical and Translational Research, University of Maryland Westin Brain Institute, Toronto, Canada
2019-2021	<i>Ad hoc member</i> , NIH/CSR, Imaging-guided Interventions and Surgery Study Section (IGIS)
2019	<i>Invited member</i> , Board of Scientific Counsellors, National Institute of Neurological Diseases and Stroke (NINDS)
2019	<i>Ad hoc member</i> , ZCA1 RPRB-N Study Section, NIH SPORE (P50) Review
2020-2022	<i>Ad hoc member</i> , Bioengineering, Technology and Surgical Sciences (BTSS) Study Section
2020	<i>Ad hoc member</i> , ZCA1 RPRB-6 (J1) S, NIH SPORE (P50) Review
2021	<i>Member</i> , ZRG1 IMST, NIH Special Emphasis Panel, Cancer Nanotechnology
2022-2027	<i>Member</i> , Image-Guided Interventions in Surgery Study Section, NIH Center for Scientific Review

Teaching Service

2010	Teaching Assistant, Medical Student Residency Preparation Course (“Triple”). Johns Hopkins University School of Medicine
2010-2011	Teaching Assistant, Neuroscience. Johns Hopkins University School of Medicine
2012-present	Resident Didactic and Surgical Anatomy Curriculum, Department of Neurosurgery, University of Maryland Medical Center <ul style="list-style-type: none">- Contributed to the establishment of neurosurgical anatomy lab and dissections program- Performed prosections with residents to detail skull base and microsurgical anatomy of neurosurgical approaches. (2 hours per session, 2-4 dissections/year)- Established biannual Neurosurgical Anatomy and Operative Skills Workshop for Hopkins, Medstar, and Maryland neurosurgery residents, held Fall and Spring each year.
2013-present	Graduate Faculty, University of Maryland Graduate School, Baltimore <ul style="list-style-type: none">- Mentoring graduate student(s) in the research laboratory: 1 student, 4-6 hours/week)- Molecular Medicine Professors Rounds (1 hour per semester)
2013-2018	Neurosurgery Residency Program Liason– Department of Neurosurgery, University of Maryland Medical Center <ul style="list-style-type: none">- Monitoring of resident case logs (1-2 hours/month)- Graduate Medical Education Committee meetings (2 hours/meeting, 1 meeting/ quarter)

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- 2014-present Discussion leader, Conflicts of Interest in Biomedical Research course, CIPP 907, University of Maryland Graduate School, Baltimore (2 hours/semester)
- 2014 Lecturer, Department of Radiation Oncology – Resident Conference (1 hour/semester)
- 2015 Lecturer, Department of Neurology – Resident Conference (1 hour/semester)
- 2016-present Lecturer, Pathophysiology and Therapeutics, University of Maryland School of Medicine Core Curriculum. Lectures: Brain Tumors, Pituitary adenoma surgery, Hydrocephalus
- 2018-2020 Lecturer, Advanced Cancer Biology Course, GPLIS 760, University of Maryland School of Medicine
- 2016-2020 Course faculty, Selected Topics in Neuroplastic & Reconstructive Surgery: An International Symposium on Cranioplasty and Implantable Neurotechnology
- 2019-present Course faculty, Clinical Translation for Biomedical Engineers, University of Maryland

Scientific Mentoring

Medical Students:

- 2006 Kaisorn Chaichana, B.S., Johns Hopkins School of Medicine- Outcomes following resection of brain and spinal tumors (PMID: 17621024, 17665203, 18425015, 18447686, 19589201, 22595358).
- 2009-2010 Alfred See, B.S., Johns Hopkins School of Medicine Analysis of outcomes in endoscopic third ventriculostomy and vestibular schwannoma surgery (PMID: 22120264, 25599212).
- 2010 Chris Jackson, B.S., Johns Hopkins School of Medicine- Outcomes following resection of vestibular schwannoma (PMID: 25599212).
- 2010-2012 Thomas Link, B.S., M.S., Johns Hopkins School of Medicine- Functional outcomes following surgery for malignant glioma (PMID: 22595358).
- 2016-2018 Aymen Alqazzaz, B.S., University of Maryland School of Medicine (PMID: 30132163)
- 2018 Neila Kline B.S., UMSOM, Fn14 and nuclear envelope rupture-mediated DNA damage in glioblastoma. UMSOM Prism Awardee
- 2018 Lucy Wang B.S., UMSOM, Targeted therapeutics for metastatic brain cancer. UMSOM Prism Awardee
- 2019 Adarsha Malla, B.S., UMSOM MSTP program, Confined migration in neural precursor cells. NIH T32 and F30 Grant Awardee. UMaryland Graduate Program Thesis Project Award.
- 2019 Yamini Vyas, B.S., UMSOM, Ultrasound-enabled liquid biopsy of brain tumors. AOA Carolyn L. Kuckein Student Research Fellowship awardee 2020

Surgical Residents:

- 2014 Akil Patel, M.D., Department of Neurosurgery, University of Maryland Medical Center, Diagnosis and management of post-operative pseudoaneurysms. (PMID: 24818055)
- 2013-2017 David Hersh, M.D., Department of Neurosurgery, University of Maryland Medical Center. Fn14 gene expression in glioma molecular subtypes, Focused ultrasound applications in brain disease. (PMID: 26481053, 26685681, 26954763, 27369449, 29415084, 29453678). Young Investigator Award, Focused Ultrasound Foundation 2016.
- 2018-2022 Abdul Ahmed, M.D., Department of Neurosurgery, University of Maryland Medical Center. Ultrasound-enhanced liquid biopsy of brain tumors. Donald Quest Award: AANS 2020. Young Investigator Award, Focused Ultrasound Foundation 2020. NASBS 2021 Podium Presentation. PMID: 34504017
- 2023 David Asuzu MD, PhD, Department of Neurosurgery, University of Virginia/NIH. SNS NSTP National Mentoring Program.
- 2024 Maureen Rackovec, MD, Department of Neurosurgery, University of Maryland Medical Center. Focused ultrasound-based approaches for infiltrating gliomas

Summer & rotation students:

- 2014 Haelee Pettingill, St. Mary's College, St. Mary's City, MD
- 2015 Adip Bhargav, M-Scholars Intern Program, University of Maryland School of Medicine and College Park
- 2015 Arjun Adapa, M-Scholars Intern Program, University of Maryland School of Medicine and College Park
- 2015 Philip Smith, B.S., MD/PhD MSTP, University of Maryland School of Medicine
- 2016 Jay Swayambunathan, M-Scholars Intern Program, University of Maryland School of Medicine and College Park
- Nathalie Chen, Schnaper Intern Program, University of Maryland School of Medicine, Carnegie Mellon University, Pittsburgh, PA
- 2017 Sara Barlow, Schnaper Intern Program, University of Maryland School of Medicine, Grand Valley State University, Allendale, MI
- 2017 Pranjali Kanvinde, Molecular Medicine program, University of Maryland School of Medicine
- 2018 Nicole Gould, Molecular Medicine program, University of Maryland School of Medicine
- 2018 Ravina Pandita, B.S., Molecular Medicine program, University of Maryland, Baltimore
- 2018 Jacqueline Wang, Schnaper Intern Program, University of Maryland School of Medicine. (PMID: 30132163)
- 2019 Jennifer Mariano, B.S. Molecular Medicine program, University of Maryland, Baltimore
- 2019 Sarah Talamantez-Lyburn, Molecular Medicine program, University of Maryland, Baltimore
- 2019 Mitasha Palha, Molecular Medicine program, University of Maryland, Baltimore

- 2019 Blair Landon, Schnaper Intern Program, University of Maryland School of Medicine
- 2019 Bruck Negash, M-Scholars Intern Program, University of Maryland School of Medicine and College Park

Masters students:

- 2011-2012 Ting-Yu Shih, B.S., *M.S. Candidate*, Johns Hopkins Department of Chemical and Biomolecular Engineering - Drug-loaded brain penetrating nanoparticle therapy for glioblastoma. (PMID: 24979210)

Graduate students:

- 2011-2012 Clark Zhang, B.S., Johns Hopkins Department of Chemical and Biomolecular Engineering, Nanoparticle-mediated drug delivery for brain tumors. (PMID: 25761435, 25542792)
- 2014-2018 Jimena Perez, B.S., University of Maryland School of Medicine, GPLIS Molecular Medicine Program. Fn14 signaling and therapeutic targeting in glioblastoma. (PMID: 25542792, 26415854, 26300004, 29453678) T32 Cancer Biology Grant 2016. Current Position: FDA Research Analyst
- 2015-2018 Nathan Roberts, B.S., UMSOM MSTP MD-PhD program, Immunomodulation of the GBM microenvironment (PMID: 26685681, 28887134). NIH F30 Grant Award, First-percentile score, 2017. Current Position: Emergency Medicine residency
- 2018-2021 Oleg Makarevich, B.S., Medical Scientist Training Program - Thesis Committee - 'Functional cooperation between Sp1 and p53 to activate neuronal apoptotic pathways', Genome Biology track, Molecular Medicine Graduate Program, University of Maryland School of Medicine
- 2018-present Pranjali Kanvinde, B.S., GPLIS Molecular Medicine program, University of Maryland School of Medicine. 'Impact and therapeutic implications of Fn14 in the glioblastoma microenvironment' (PMID: 33638562)
- 2018-2022 Christine Carney, B.S., GPLIS Microbiology and Immunology program, University of Maryland School of Medicine. 'Impact and therapeutic implications of Fn14 in the breast cancer microenvironment'. 2023 PhD Thesis Award – University of Maryland. Current Position: Post-doctoral Fellow, FDA (PMID: 34716900, 35787387, 36374573)
- 2019 Babar Khan, M.D., Doctoral Research Program, The Elmezzi Graduate School of Molecular Medicine, NY. 'Targeting glioblastoma heterogeneity with miRNA nanoparticles'
- 2019-present Shruti Vig, B.S., Graduate Program in Bio-engineering, University of Maryland Graduate School, 'Sonodynamic therapy for glioblastoma'. MPOWER fellowship awardee. Co-mentor: HC Huang. (PMID: 37496175)
- 2019 Brandon Gailtan, B.S., University of Maryland Department of Biomedical Engineering, "Fluorescent 3D imaging device for enhanced glioma resections"
- 2021-present Adarsha Malla, B.S., UMSOM MSTP MD-PhD program, Image-guided interventions in brain tumors and neurosurgery. MSTP T32 grant awardee, NRSA F30 grant awardee. (PMID: 33638562, 35604202)

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- 2022-present Hassan Saidi, B.S., UMSOM MSTP MD-PhD program, Impact of confined migration on invasive brain tumor biology. MSTP T32 grant awardee
- 2023-present Alexandra Seas, B.S., UMSOM MSTP MD-PhD program, NP-enabled somatic gene editing of neuroligin 3 localized with focused ultrasound
- 2024-present Jennifer Fang, B.S., UMSOM MSTP MD-PhD program, Advancing AI-based tumor infiltration predictions for improved management of glioblastoma

Post-doctoral research fellows:

- 2009-2010 Thomas Garzon-Muvdi, M.D., Department of Neurosurgery, Johns Hopkins School of Medicine- Pseudoprogression following treatment of malignant glioma (PMID: 25599212, 23666202). *Current Position:* Assistant Professor, Department of Neurosurgery, Emory University
- 2013-2014 Craig Schneider, M.D., University of Maryland School of Medicine, Preclinical models of glioblastoma and targeted therapeutics for invasive brain cancer (PMID: 25542792, 26300004, 26415854). *Current Position:* Radiation Oncologist, Cancer Care Group, Indianapolis, IN
- 2014-2019 Nina Connolly, Ph.D., University of Maryland School of Medicine, Preclinical models of glioblastoma and targeted therapeutics for invasive brain cancer (PMID: 26300004, 26685681, 28358926, 29352201). T32 Cancer Biology Grant 2015. *Current Position:* Researcher, St. Jude Children's Research Hospital
- 2015-2019 Aniket Wadajkar, Ph.D., University of Maryland School of Medicine, Immunomodulatory nanotherapeutics and enhanced local delivery for invasive brain cancer (PMID: 26415854, 26685681, 27813323, 28887134). ACS-IRG Grant and T32 Cancer Biology Grant 2017. *Current Position:* Associate Director, Nanoparticle Platforms, Nextimmune, Gaithersburg, MD
- 2017-2021 Paul Anastasiadis, Ph.D., University of Maryland School of Medicine, Acoustic activation of the glioma-brain microenvironment. (PMCID: 5418115, 5802894) T32 Cancer Biology Grant 2017, Bracco Suisse SA Young Investigator Award 2018, Focused Ultrasound Foundation. *Current Position:* Assistant Professor, University of Maryland Department of Neurosurgery
- 2019-2022 Nikhil Pandey, Ph.D., University of Maryland School of Medicine, Immunomodulatory nanotherapeutics and enhanced local delivery for invasive brain cancer. AAPS Best Abstract Award 2020. *Current Position:* Research Associate, University of Maryland Department of Neurosurgery.
- 2019-2021 Anshika Kapur, Ph.D., University of Maryland School of Medicine, Nanotherapeutics trafficking and optimization for primary and metastatic brain cancers. AAPS Best Abstract Award 2020. *Current Position:* Professor, Department of Chemistry, Mt. San Jacinto College
- 2024-present Ahmad Ozair, MD, MPH, University of Maryland School of Medicine,. Predicting Bioeffect Outcomes of Microbubble-assisted Focused Ultrasound for Patients with Glioblastoma through Advanced Data

Science. Bagley Research Fellow, CTSA/NIH: Accelerated Translational Incubator Pilot (ATIP) Program Grant. Successful neurosurgery match: Montreal Neurological Institute

Junior faculty:

- 2013 Gary Schwartzbauer, M.D., Ph.D., Assistant Professor - Department of Neurosurgery, University of Maryland School of Medicine. Cerebral edema and cerebral malaria, K08 Grant proposal development
- 2014 Shahid Nimjee, M.D., Ph.D., Assistant Professor - Department of Neurosurgery, Ohio State University Medical Center, K12 grant proposal development. NINDS NRCDP K12 Awardee
- 2017 David Benavides, M.D., Ph.D., Assistant Professor – Department of Neurology, University of Maryland School of Medicine, Neurobiology of antibody-mediated injury in neurological disease, K08 grant proposal development. NIH/NINDS K08 Awardee (first submission)
- 2018 Heather Ames, M.D., Ph.D., Assistant Professor – Department of Pathology, University of Maryland School of Medicine, Dissecting to role of Fn14 in glioblastoma invasion, K08 proposal development. Passano Foundation Clinician-Scientist awardee
- 2019 Winson Ho, M.D., Ph.D., Assistant Professor - Department of Neurosurgery, University of Texas-Austin, Pediatric brain tumor immunotherapy- K12/K08 proposal development, NINDS NRCDP K12 Awardee.
- 2020 David Hersh, M.D., Assistant Professor – Department of Neurosurgery, University of Connecticut School of Medicine, Connecticut Children’s Hospital. K12/K08 proposal development
- 2020 Alexander Ksendzovsky, M.D., Ph.D., Assistant Professor – Department of Neurosurgery, University of Maryland School of Medicine. K12/K08 proposal development. NREF young investigator grant awardee.
- 2021 Kalil G. Abdullah, M.D., MSc., Assistant Professor - Department of Neurosurgery, University of Pittsburgh Medical Center. Cancer Prevention Research Institute of Texas (CPRIT) Award, \$1.5M
- 2022 Whitney Parker, M.D., Ph.D., Assistant Professor – Department of Neurosurgery, K12/K08 proposal development. Passano Foundation Clinician-Scientist awardee

Grants and Contracts

ACTIVE

- 03/01/18-02/28/25 (PI: Kim, co-I: Woodworth)
“Impact of Fn14-targeted nanoparticles for triple-negative breast cancer”
NIH/NCI R37CA218617-03
Annual Direct Costs: \$228,720
Total Direct Costs: \$1,601,040

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- 04/01/19-03/31/25 (PI, Woodworth, co-PI: Kim, Winkles)
“Nanotherapeutic treatment of the invasive glioblastoma microenvironment”
NIH/NINDS R01 NS107813
Annual Direct Costs: \$267,817
Total Direct Costs: \$1,360,000
- 12/01/22-11/3/27 (PI: Woodworth; coPI, Huang, Kim, Winkles)
“Nanotherapeutic enhancement of interstitial thermal therapy for glioblastoma”
NIH NCI R01 CA269995
Annual Direct Costs: \$500,000
Total Direct Costs: \$2,500,000
- 04/01/23-03/31/28 (PI: Arvanitis, coPI: Woodworth, Kwong, Kalinsky)
“Breast Cancer Brain Metastasis Therapy by Focused Ultrasound-Guided Control of HER2 CAR T cells”
NIH NCI R01CA273878
Annual Direct Costs: \$500,000
Total Direct Costs: \$2,500,000
- 04/01/24-3/31/27 (PI: Malla, mentor: Woodworth)
“ImmunoPET Evaluation of Focused Ultrasound-mediated Delivery and Immunomodulation by anti-CD47 Immunotherapy in the Setting of Current Standard-of-Care Treatment for Glioblastoma”
NIH NCI F30CA284526
Annual Direct Costs: \$36,338
Total Direct Costs: \$109,014
- 06/01/24-05/30/26 (PI: Woodworth, coPI: Bar, Scarcelli)
“Mechano-biological analyses of human neural stem cells in confined migration”
Maryland Stem Cell Research Foundation
Annual Direct Costs: \$310,000
Total Direct Costs: \$620,000
- 07/01/24-06/30/25 (PI: Woodworth, Co-I Bettegowda)
“Predicting bioeffect outcomes of microbubble-assisted focused ultrasound for patients with glioblastoma through advanced data science”
Johns Hopkins Institute for Clinical and Translational Research (ICTR)-Accelerated Translational Incubator Pilot (ATIP) Program
Annual Direct Costs: \$50,000
Total Direct Costs: \$50,000

PENDING

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04/01/25-03/31/28 (PI: Anastasiadis, co-I: Woodworth)
“Harmonic dosing in theragnostic applications of focused ultrasound for infiltrating gliomas”
NIH NCI R01NS141877
Annual Direct Costs: \$250,000
Total Direct Costs: \$1,250,000

10/01/25 – 09/30/30 (PI: Woodworth, Suk, Pouloupoulos)
“Targeting glioma cell-neural interactions in GBM”
NIH NS R01NS139488
Annual Direct Costs: \$500,000
Total Direct Costs: \$2,500,000
Impact Score: 25%ile

COMPLETED

04/01/20-07/31/24 (PI, Woodworth)
“Acoustic activation of the GBM-brain microenvironment for improved immunotherapy”
Focused Ultrasound Foundation
Annual Direct Costs: \$100,000
Total Direct Costs: \$200,000

04/01/22-7/31/24 (PI, Woodworth; co-I, Kim, Arvanitis, Janowski, Walczak)
“PET-labeling and Testing of Paclitaxel Nanoformulations with MB-FUS”
Focused Ultrasound Foundation
Annual Direct Costs: \$100,000
Total Direct Costs: \$200,000

07/01/20-11/30/23 (PI, Huang; co-I, Woodworth)
“Photosensitizing nanoconstructs for regulation of ATP-binding cassette transporters in the brain”
NSF CBET 2030253
Annual Direct Costs: \$218,000
Total Direct Costs: \$ 650,000

07/15/19-06/14/23 (mPI, Bettegowda, Woodworth)
“MRgFUS-enabled non-invasive interrogation of malignant glioma via circulating tumor DNA”
NIH/NINDS R21NS113016
Annual Direct Costs: \$349,937
Total Direct Costs: \$632,000

07/01/20-03/31/23 (PI, Huang, co-I, Woodworth)
“Photodynamic priming for bidirectional modulation of drug transport across the blood-brain tumor barrier”
NIH/NIBIB R21EB028508

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Annual Direct Costs: \$208,000

Total Direct Costs: 610.000

- 09/01/20-08/31/22 (PI, Pearl; co-I, Woodworth)
"Enhanced intra-arterial drug delivery to the brain after blood brain barrier opening: comparison between osmotic and MRI-guided focused ultrasound opening techniques"
NIH/NINDS R21 NS118232
Annual Direct Costs: \$100,000
Total Direct Costs: \$200,000
- 01/01/19-12/30/21 (mPI: Huang, Chen, Woodworth)
"Image-guided photodynamic priming to prevent brain tumor recurrence"
UMB-UMCP Research and Innovation MPower Grant
University System of Maryland
Annual Direct Costs: \$75,000
Total Direct Costs: \$150,000
- 08/01/19-09/31/20 (mPI, Kim, Winkles, Woodworth)
"Development of the DART therapeutic nanoparticle platform for Fn14-positive cancers"
Maryland Innovation Initiative Technology Assessment Program
Annual Direct Costs: \$115,000
Total Direct Costs: \$115,000
- 07/01/16-06/30/20 (PI, Woodworth)
"Fn14-targeted biodegradable BCNU-loaded nanoparticles for invasive brain cancer"
American Cancer Society RSG-16-012-01-CDD
Annual Direct Costs: \$157,157
Total Direct Costs: \$628,628
- 07/01/17-06/30/20 (PI – Anastasiadis; mentor, Woodworth)
"Acoustic activation of the invasive glioblastoma microenvironment"
NIH/NCI T32 CA15427
Annual Direct Costs: \$70,000
Total Direct Costs: \$210,000
- 07/01/16-06/30/20 (PI, Mayer; co-I, Woodworth)
"Exploiting altered porphyrin synthesis for metabolic imaging of glioblastoma"
NIH/NCI R21 CA202694
Annual Direct Costs: \$130,500
Total Direct Costs: \$275,000
- 01/01/18-01/01/20 (PI, N. Roberts; mentor, Woodworth)
"Improving CNS delivery of chemotherapeutics to invasive brain cancer"

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NIH/NCI F30 CA216970

Annual Direct Costs: \$40,000

Total Direct Costs: \$120,000

09/15/14-08/31/19 (PI, Woodworth, 50%)
“Brain-penetrating nanoparticle therapeutics for invasive brain cancer”
NIH/NINDS K08 NS090430
Annual Direct Costs: \$150,000
Total Direct Costs: \$750,000

07/01/18 – 6/30/19 (mPI: Winkles, Woodworth, Devine, Kim)
“Identification of TWEAK/Fn14 signaling nodes of vulnerability for improved treatment of glioblastoma”
CRF Pilot Grant
University of Maryland Comprehensive Cancer Center
Annual Direct Costs: \$150,000
Total Direct Costs: \$150,000

07/01/18-06/30/19 (mPI: Mayer, Woodworth, Raghavan, Ho)
“Hyperpolarized [1-13C] pyruvate metabolic imaging for noninvasive diagnosis and monitoring of glioblastoma”
ICTR Pilot Grant
University of Maryland School of Medicine
Annual Direct Costs: \$35,000
Total Direct Costs: \$35,000

02/01/17-02/01/18 (PI, Woodworth)
“Investigation and development of materials with acoustic transparency for cranioplasty applications”
UM-Ventures Fund
Annual Direct Costs: \$20,000
Total Direct Costs: \$20,000

10/01/16-10/01/17 (PI, Woodworth)
“Focused-ultrasound mediated blood brain barrier disruption for improved therapeutic delivery to invasive brain cancer”
UM-GCCC Pilot Research Grant
Annual Direct Costs: \$50,000
Total Direct Costs: \$50,000

09/01/16-07/01/17 (PI, Woodworth)
“Focused ultrasound immunomodulation in a mouse GL261 intracranial glioma model”
Focused Ultrasound Foundation
Annual Direct Costs: \$59,000
Total Direct Costs: \$59,000

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- 05/01/16 – 04/30/17 (M-PI, Frenkel, Woodworth, Kim)
“Effect of pulsed focused ultrasound on microstructures in the brain”
NSF/CBET EAGER 1557922
Annual Direct Costs: \$154,000
Total Direct Costs: \$154,000
- 06/01/14-06/01/16 (M-PI, Mayer, Woodworth, Frenkel)
“Leveraging altered porphyrin synthesis for metabolic imaging and sonodynamic therapy for glioblastoma”
Dean’s Challenge Award
Annual Direct Costs: \$40,000
Total Direct Costs: \$80,000
- 01/01/15-01/01/16 (Co-I, Woodworth; PI, Kim)
“Fn14-targeted nanotherapeutics for glioblastoma: distribution, pharmacokinetics, and efficacy studies”
American Cancer Society Institutional Research Grant
Annual Direct Costs: \$100,000
Total Direct Costs: \$100,000
- 01/01/13-12/31/15 (PI, Woodworth)
“Targeted brain-penetrating nanoparticle gene delivery for glioblastoma”
Passano Foundation Clinician-Scientist Award
Annual Direct Costs: \$45,000
Total Direct Costs: \$90,000
- 01/01/13-12/31/15 (PI, Woodworth)
“Targeted brain-penetrating nanoparticle gene delivery for glioblastoma”
NIH/NINDS K12NS080223
Annual Direct Costs: \$115,000
Total Direct Costs: \$230,000

CLINICAL TRIALS (Investigator Initiated)

- 07/25/19-07/24/25 (PI, Woodworth, Mishra)
“Laser Interstitial Thermal Therapy (LITT) followed by Hypofractionated Radiation Therapy for Recurrent High-Grade Gliomas”
Keep Punching Foundation, GCCC19140, NCT04181684
- 02/01/21-02/01/25 (PI, Woodworth, Mishra)
“Laser Interstitial Thermal Therapy (LITT) followed by Hypofractionated Radiation Therapy for Newly Diagnosed Gliomas”
Keep Punching Foundation, GCCC20138, NCT04699773
- 07/01/22-12/31/24 (PI, Woodworth)

“A Pivotal Study to Evaluate the Safety and Effectiveness of Exablate Model 4000 Using Microbubble Resonators to Temporarily Mediate Blood-Brain Barrier Disruption (BBBD) for Liquid Biopsy in Subjects with Glioblastoma Brain Tumors”
InSightec, BT015, NCT05383872

CLINICAL TRIALS (Other)

06/01/22-06/01/24 (site PI, Woodworth)
“A Randomized Pivotal Study Assessing the Efficacy of Targeted Blood-Brain Barrier (BBB) Disruption Using Exablate Focused Ultrasound During the Standard of Care Treatment of Brain Metastases of Non-small Cell Lung Cancer (NSCLC) Origin”
InSightec, BT012, NCT05317858

CLINICAL TRIALS (Completed)

10/01/20-08/31/23 (site PI, Woodworth)
“Exablate Blood-Brain Barrier Disruption for the Treatment of recurrent GBM in Subjects Undergoing Carboplatin Monotherapy”
InSightec, BT009, NCT05383872

09/01/18-08/31/22 (PI, Woodworth)
“Assessment of Safety and Feasibility of ExAblate Blood-Brain Barrier Disruption for the Treatment of High-Grade Glioma in Patients Undergoing Standard Chemotherapy”
InSightec, BT008, NCT03551249

05/01/16-02/01/19 (site PI, Woodworth)
“Vaccine Therapy with Bevacizumab Versus Bevacizumab Alone in Treating Patients with Recurrent Glioblastoma Multiforme That Can Be Removed by Surgery”
NCT01814813

07/01/18-06/30/21 (PI, Woodworth)
“ExAblate Blood Brain Barrier Disruption (BBBD) for Planned Surgery in Glioblastoma”
InSightec, BT004, NCT03322813

Philanthropy

2016-present Maryland Brain Tumor Program - Research Fund
University of Maryland Medicine
Total: \$8.7 million

2018-present Hillman Brain Tumor Research Fund
Department of Neurosurgery
Total: \$125,000

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2019	Establishment of the <i>Howard M. Eisenberg Distinguished Professorship</i> in Neurosurgery, University of Maryland School of Medicine. Total: \$2.7 million
2019	Establishment of <i>Hevy-Thompson Professorship</i> in Neurosurgery, University of Maryland School of Medicine Total: \$1.5 million
2020-present	Neurosurgery Residents Fund Department of Neurosurgery Total: \$300,000
2022-present	Establishment of the <i>J. Marc and Phillip Simard Family Laboratory</i> Department of Neurosurgery Total: \$2.1 million
2023-present	Establishment of the <i>Maryland Focused Ultrasound Center</i> University of Maryland School of Medicine Total: \$1.5 million

Total Raised: **\$16.925 million**

Patents

“Rapid diffusion of large polymeric nanoparticles in the mammalian brain”. **Woodworth GF**, Nance EA, Hanes J. Priority 2010-09-10, Filing 2011-09-12. Awarded 2019-06-04:
US10307372B2 (Exp. 2033)

“Interlaminar, interspinous stabilization devices for the cervical spine” **Woodworth GF**.
US20160135851A1, Priority 2014-11-13, Filing 2015-11-12, Awarded: 2019-05-07.
US10278745B2 (exp. 2035)

“Targeted Structure-Specific Particulate Delivery Systems” **Woodworth GF**, Hanes J, Winkles JA, Kim AJ, Schneider CS. Priority 2014-11-21, Filing 2015-11-20, Awarded 2020-10-23: **EP 3 220 900 (Exp. 2035)**

“Engineering Synthetic Brain Penetrating Gene Vectors”. Hanes J, Suk JS, Mastorakos P, Zhang C, **Woodworth GF**. Priority 2014-05-12, Filing 2015-05-12, Awarded 2020-10-22
US20200129641A1, JP2020172534A (Exp. 2036)

“Decreased Adhesivity Receptor-Targeted Nanoparticles for Fn14-Positive Tumors”.
Woodworth GF, Kim, AJ, Wadajkar A, Winkles JA. US 16/289,424, Filing 2019-28-02.
Awarded: 2021-06-29 **US20210030689A1 (Exp. 2037)**

Regulatory Activities

Study	Meeting Date	Meeting Type
NCT03322813-BT004	21-Sep-2016	FDA Pre-Submission Meeting
NCT03322813-BT004	15-Sep-2017	FDA Conference Call - Deficiency Response
NCT03551249-BT008	30-Jan-2018	FDA Pre-Submission Meeting
NCT04417088-BT009	3-Dec-2019	FDA Pre-IND Meeting
NCT04667715-BT011	1-Jul-2019	FDA Pre-Submission Meeting
NCT04667715-BT011	17-Mar-2020	FDA Pre-Submission Meeting
NCT05383872	Oct 2022-May 2024	FDA Pre-Submission Meetings, IDE meetings
Humanitarian Device Exemption	February 2024	FDA Meeting

Publications

Peer-Reviewed Journal Articles

1. Sarracino DA, Steinberg JA, Vergo MT, **Woodworth GF**, Tetzlaff CN, Richert C. 5'-Peptidyl substituents allow a tuning of the affinity of oligodeoxyribonucleotides for RNA. *Bioorganic and Medicinal Chemistry Letters*, 1998, 8: 2511-2516. PMID: 9873571
2. Brooks PR, Wirtz MC, Vetelino MG, **Woodworth GF**, Morgan BP, Coe JW. Boron Trichloride/Tetra-n-Butylammonium Iodide: A mild, selective combination reagent for the cleavage of primary alkyl esters and aryl ethers. *Journal of Organic Chemistry*, 1999, 64: 9719-9721.
3. Morgan BP, Trilles RV, **Woodworth GF**. New, scalable route for the synthesis of a trans-fused hexahydro-1H-phenathre-2-one from a conjugated tetrahydro-3H-phenathre-2-one. *Synthetic Communications*, 2003, 33: 915-920.
4. McGirt MJ, **Woodworth GF**, Lynch JR, Laskowitz DT. Statins for the treatment of neurological injury: A role beyond cholesterol lowering. *Clinical Neurosurgery*, 2003, 51: 320-328. PMID: 15571161
5. Morgan BP, Liu KK, Dalvie DK, Swick AG, Hargrove DM, Wilson TC, LaFlamme JA, Moynihan MS, Rushing MA, **Woodworth GF**, Li, J, Trilles RV, Yang X, Harper KW, Carroll RS, Martin KA, Nardone NA, O'Donnell JP, Faletto MB, Vage C, Soliman V. Discovery of potent, non-Steroidal, and highly selective glucocorticoid receptor antagonists with anti-obesity activity. *Letters in Drug Discovery and Design*, 2004, 1: 1-5.
6. McGirt MJ, **Woodworth GF**, Thomas G, Miller N, Williams M, Rigamonti D. Cerebrospinal fluid shunting for pseudotumor cerebri associated intractable headache: Predictors of treatment response and analysis of long-term outcomes. *J Neurosurgery*, 2004, 101: 627-632. PMID: 15481717
7. **Woodworth GF**, McGirt MJ, Rigamonti D. Use of ventriculoperitoneal shunts in patients with uncontrollable intracranial hypertension secondary to HIV-associated cryptococcal meningitis. *Surg Neurol.*, 2005, 63: 529-31. PMID: 15936373
8. McGirt MJ, **Woodworth GF**, Pradilla, G, Warner D, Tamargo R, Clatterbuck RC, Lynch DR, Laskowitz DT. Simvastatin attenuates experimental cerebral vasospasm and ameliorates serum markers of neuronal and endothelial injury in patients after subarachnoid hemorrhage: A dose-response effect dependent on endothelial nitric oxide synthase. *Clin Neurosurgery*, 2005, 52: 371-8. PMID: 16626096

9. McGirt MJ, **Woodworth GF**, Frazier JM, Coon AL, Olivi A, Weingart JD. Independent predictors of morbidity after image-guided stereotactic brain biopsy: A risk assessment of 270 cases. *Journal of Neurosurgery*, 2005, 102: 897-901. PMID: 15926716
10. **Woodworth GF**, McGirt MJ, Samdani A, Garonzik I, Olivi A, Weingart JD. Accuracy of frameless and frame-based MRI-guided stereotactic brain biopsy in the diagnosis of glioma: Comparison of biopsy and open resection specimen. *Neurological Research*, 2005 27: 358-62. PMID: 15949232
11. **Woodworth GF**, McGirt MJ, Rigamonti D. Frameless stereotactic ventricular shunt placement for pseudotumor cerebri. *Stereotactic and Functional Neurosurgery*, 2005, 83: 12-16. PMID: 15724109
12. Sciubba D, Stuart RM, McGirt MJ, **Woodworth GF**, Jallo GI, Carson B. Effect of antibiotic-impregnated shunt catheters in decreasing the incidence of shunt infection in the treatment of hydrocephalus. *J Neurosurgery*, 2005, 103: 131-6. PMID: 16370278
13. **Woodworth GF**, McGirt MJ, Gailloud P, Clatterbuck RC. Evaluation of a distal, non-mycotic pericallosal artery aneurysm visualized with 3-dimensional digital subtraction angiography: case report and treatment implications. *Surgical Neurology*, 2005, 64: 321-4. PMID: 16229089
14. Cowan JA, McGirt MJ, **Woodworth GF**, Rigamonti DR, Williams MA. The syndrome of hydrocephalus in young and middle-aged adults (SHYMA). *Neurological Research*, 2005, 27: 540-7. PMID: 15978182
15. McGirt MJ, **Woodworth GF**, Coon AC, Thomas G, Williams M, Rigamonti D. Diagnosis, treatment, and analysis of long-term outcomes in idiopathic normal pressure hydrocephalus. *Neurosurgery*, 2005, 57: 699-705. PMID: 16239882
16. McGirt MJ, **Woodworth GF**, Coon A, Brooke B, Jain S, Buck D, Tamargo R, Perler B. 3-hydroxy-3-methylglutaryl coenzyme A reductase inhibitors reduce the risk of perioperative stroke and mortality after carotid endarterectomy. *J Vasc. Surg.*, 2005, 42: 829-36. PMID: 16275430
17. Thomas G, McGirt MJ, **Woodworth GF**, Williams M, Hillis A, Rigamonti D. Baseline neuropsychological profile can predict cognitive response to CSF shunting for idiopathic normal pressure hydrocephalus. *Dement Geriatr Cogn Disord*, 2005, 20: 163-8. PMID: 16020945
18. **Woodworth GF**, McGirt MJ, Samdani A, Garonzik I, Olivi A, Weingart JD. Frameless Image-Guided Stereotactic Brain Biopsy: Diagnostic Yield, Operative Morbidity, and Comparison with the Frame-based Technique. *J Neurosurgery*, 2006, 104: 233-7. PMID: 16509497
19. McGirt MJ, **Woodworth GF**, Coon A, Brooke B, Jain S, Buck D, Tamargo RJ, Perler B. Hyperglycemia independently increases the risk of perioperative stroke, myocardial infarction, and death after carotid endarterectomy. *Neurosurgery*, 2006, 58: 1066-73. PMID: 16723885
20. Sciubba DM, Mavinkurve GG, Gailloud P, Garonzik IM, Recinos PF, McGirt MJ, **Woodworth GF**, Witham T, Khavkin Y, Gokaslan ZL, Wolinsky JP. Preoperative imaging of cervical spine hemangioblastomas using three-dimensional fusion digital subtraction angiography. Report of two cases. *J Neurosurg Spine*, 2006, 5: 96-100. PMID: 16850967
21. McGirt MJ, Blessing R, Alexander MJ, Nimjee SM, **Woodworth GF**, Friedman AH, Graffagnino C, Laskowitz DT, Lynch JR.. Risk of cerebral vasospasm after subarachnoid hemorrhage reduced by statin therapy: A multivariate analysis of an institutional experience. *J Neurosurgery*, 2006, 105: 671-4. PMID: 17121126
22. McGirt MJ, Buck D, **Woodworth GF**, Sciubba D, Carson B, Jallo GI. Adjustable versus set-pressure valves decrease the risk of shunt failure in the treatment of pediatric hydrocephalus. *Childs Nerv Syst.*, 2007, 23: 289-95. PMID: 17106749

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Case Reports:

1. **Woodworth GF**, McGirt MJ, Gailloud P, Clatterbuck RC. Evaluation of a distal, non-mycotic pericallosal artery aneurysm visualized with 3-dimensional digital subtraction angiography: case report and treatment implications. *Surgical Neurology*, 2005, 64: 321-4. PMID: 16229089

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2. Dunn IF, **Woodworth GF**, Siddiqui A, Smith ER, Vates GE, Day AL, Goumnerova L. Traumatic pericallosal artery aneurysm—a rare complication of the transcallosal surgical approach. *J Neurosurgery: Pediatrics*, 2007, 106(2): 153-7. PMID: 17330545
3. Patel AP, Gandhi D, Taylor RJ, **Woodworth GF**. Use of Dyna CT in the evaluation and treatment of pseudoaneurysm secondary to craniofacial tumor resection: Case report and diagnostic implications. *Surg Neurol Int.*, 2014, 11:48. PMID: 24818055
4. Lamos, EM, **Woodworth GF**, Munir KM. Carotid artery aneurysm resulting in myxedema coma. *Interdisc. Neurosurgery*, June 2015, 2:2, 120-22.
5. Hersh DS, Houbova P, Castellani RJ, Rodriguez FJ, Mehta MP, **Woodworth GF**. Pathologic deposition of non-amyloid immunoglobulin in the brain leading to mass effect and neurological deficits. *J Clin Neurosci*. 2016 Mar 4. PMID: 26954763

Book Chapters

1. Subtemporal Extradural Approach – Core techniques in Operative Neurosurgery. Edited by: Rahul Jandial, MD, PhD; Paul C. McCormick, MD, MPH, FACS; Peter M. Black, MD, PhD.
2. Intracystic Therapies for Craniopharygioma - Controversies in Brain Tumor Surgery. Edited by Alfredo Quinones-Hinojosa, M.D.
3. Novel Delivery Strategies - Malignant Brain Tumors: State-of-the-Art Treatment, Edited by Joseph M Piepmeier, MD; Jennifer Moliterno Gunel, MD; and Joachim M. Baehring, MD, DSc.
4. Surface-modified Nano-drug Carriers for Brain Cancer Treatment. Topics in Drug Delivery. Aniket S. Wadajkar, Nina P. Connolly, Christine P. Carney, Pranjali P. Kanvinde, Jeffrey A. Winkles, Graeme F. Woodworth, Anthony J. Kim
5. Focused Ultrasound-mediated Blood-Brain Barrier Disruption for Enhanced Drug Delivery to Brain Tumors. Pavlos Anastasiadis, Jeffrey A. Winkles, Anthony J. Kim, Graeme F. Woodworth. Springer Nature, Nanotherapy for Brain Tumor Drug Delivery
6. Case studies: Gliomas and other intrinsic tumors. Intrinsic and Skull Base Tumors, first edition. Editors: Kaisorn Chaichana, M.D., Alfredo Quinones, M.D.

Invited Reviews and Commentaries

1. **Woodworth GF**, Schwartz TH. Anatomic lines and extent of exposure in expanded endoscopic approaches to the cranio-vertebral junction. *World Neurosurgery*, 2011, 76: 76-8.
2. **Woodworth GF**, McCoul E, Anand V, Schwartz TH. Endoscopic management of anterior cranial fossa meningiomas. *Operative Techniques in Otolaryngology – Head and Neck Surgery*, 2011, 22, 254-262.
3. Hersh DS, Mehta RI, **Woodworth GF**, Castellani RJ. The Molecular Pathology of Primary Brain Tumors. *Path Case Rev*. 2013, 18 (5), 210-220.
4. **Woodworth GF**, Simard JM. Letter by Woodworth and Simard Regarding Article, "Outcome Following Decompressive Hemicraniectomy for Malignant Cerebral Infarction: Ethical Considerations. *Stroke*. 2015 Nov;46(11):e245. PMID: 26443827
5. Schoen S Jr, Kilinc MS, Lee H, Guo Y, Degertekin FL, **Woodworth GF**, Arvanitis C. Towards controlled drug delivery in brain tumors with microbubble-enhanced focused ultrasound. *Adv Drug Deliv Rev* 2022 Jan;180:114043. doi: 10.1016/j.addr.2021.114043. PMID: 34801617
6. Carney CP, Pandey N, Kapur A, **Woodworth GF**, Winkles JA, Kim AJ. Harnessing nanomedicine for enhanced immunotherapy for breast cancer brain metastases. *Drug Deliv*

Transl Res. 2021 Dec;11(6):2344-2370. doi: 10.1007/s13346-021-01039-9. Epub 2021 Oct 30. PMID: 34716900

7. Pang S, Kapur A, Zhou K, Anastasiadis P, Ballirano N, Kim AJ, Winkles JA, **Woodworth GF**, Huang HC. Nanoparticle-assisted, image-guided laser interstitial thermal therapy for cancer treatment. *Wiley Interdiscip Rev Nanomed Nanobiotechnol.* 2022 Jun 23:e1826. doi: 10.1002/wnan.1826. PMID: 35735205
8. Pandey N, Anastasiadis P, Carney CP, Kanvinde PP, **Woodworth GF**, Winkles JA, Kim AJ. Nanotherapeutic treatment of the invasive glioblastoma tumor microenvironment. *Adv Drug Deliv Rev.* 2022 Sep;188:114415. doi: 10.1016/j.addr.2022.114415. PMID: 35787387
9. Kim AJ, Winkles JA, **Woodworth GF**. Emerging translational approaches for brain cancer therapeutics. *Adv Drug Deliv Rev.* 2022 Aug 25;189:114522. doi: 10.1016/j.addr.2022.114522. PMID: 36030017
10. Seas AA, Malla AP, Sharifai N, Winkles JA, **Woodworth GF**, Anastasiadis P. Microbubble-Enhanced Focused Ultrasound for Infiltrating Gliomas. *Biomedicines.* 2024 Jun 1;12(6):1230. doi: 10.3390/biomedicines12061230. PMID: 38927437
11. Ahmed AK, **Woodworth GF**, Gandhi D. Transcranial Focused Ultrasound: A History of Our Future. *Magn Reson Imaging Clin N Am.* 2024 Nov;32(4):585-592. doi: 10.1016/j.mric.2024.04.002. PMID: 39322349
12. Chen H, Anastasiadis P, **Woodworth GF**. MR Imaging-Guided Focused Ultrasound-Clinical Applications in Managing Malignant Gliomas. *Magn Reson Imaging Clin N Am.* 2024 Nov;32(4):673-679. doi: 10.1016/j.mric.2024.05.006.. PMID: 39322356
13. Gandhi D, **Woodworth GF**. Incisionless Precision Surgery with MR Imaging-Guided Focused Ultrasound: A Look into the Future. *Magn Reson Imaging Clin N Am.* 2024 Nov;32(4):xv-xvi. doi: 10.1016/j.mric.2024.04.007. PMID: 39322361
14. Badani A, Ozair A, Khasraw M, **Woodworth GF**, Tiwari P, Ahluwalia MS, Mansouri A. Immune checkpoint inhibitors for glioblastoma: emerging science, clinical advances, and future directions. *J Neurooncol.* 2024 Nov 21. doi: 10.1007/s11060-024-04881-2. PMID: 39570554
15. Ozair A, Wilding H, Bhanja D, Mikolajewicz N, Glantz M, Grossman SA, Sahgal A, Le Rhun E, Weller M, Weiss T, Batchelor TT, Wen PY, Haas-Kogan DA, Khasraw M, Rudà R, Soffietti R, Vollmuth P, Subbiah V, Bettgowda C, Pham LC, **Woodworth GF**, Ahluwalia MS, Mansouri A. Leptomeningeal metastatic disease: new frontiers and future directions. *Nat Rev Clin Oncol.* 2024 Dec 9. doi: 10.1038/s41571-024-00970-3. PMID: 39653782

News and Media

1. Associated Press, News Service: “*Ultrasound jiggles open brain barrier, a step to better care*”, July 2018
2. Maryland Public Television, *Direct Connection*: “*Glioblastoma and John McCain*”, September 2018
3. *Cure – ‘Cancer Updates, Research & Education*, October 2018
4. Hematology Today, “*Using ultrasound to access the brain*”, November 2018
5. Psychology today, “*Bypassing the Blood-Brain Barrier*”, January 2019
6. Healthline, “*Keytruda May Be Effective in Helping Treat Brain Cancer*”, February 2019
7. The Scientist, “*Sound Waves Aid Brain Tumor Treatment*”, October 2021
8. National Geographic, “*New method delivers life-saving drugs to the brain—using sound waves*”, May 2022

9. Maryland Medicine Alumni Magazine: *'Ultra-Focused – the History and Contributions to Focused Ultrasound at the University of Maryland'*. December 2024

Major Invited Speeches

Local

1. *"Recurrent Glioblastoma and Brain Penetrating Nanoparticles"*, Johns Hopkins Sydney Kimmel Comprehensive Cancer Center, Neuro-Oncology Research Conference, April 2011, Baltimore, MD.
2. *"Novel Approaches to Drug Delivery for Brain Tumors"*, Johns Hopkins Department of Neurosurgery, Grand Rounds, May 2011, Baltimore, MD.
3. *"Nano-particle-mediated Brain Tumor Therapy"*, Johns Hopkins Department of Neurosurgery, Grand Rounds, May 2012, Baltimore, MD.
4. *"Treatment Considerations and Surgical Management of Pituitary Adenomas"*, University of Maryland School of Medicine, Endocrinology Grand Rounds, April 2013, Baltimore, MD.
5. *"Neuro-Oncology Applications of MR-Guided Focused Ultrasound"* Society of Brain Mapping and Therapeutics, Annual Meeting May 2013, Baltimore, MD.
6. *"Advances in Therapeutic Delivery to the Brain"* University of Maryland, Department of Otolaryngology –Head and Neck Surgery, Grand Rounds October 2013, Baltimore, MD.
7. *CMIT: The Center for Integrated Metabolic Imaging and Therapeutics*. University of Maryland School of Medicine Council Meeting. September 2013, Baltimore, MD.
8. *CMIT: The Center for Integrated Metabolic Imaging and Therapeutics*. University of Maryland School of Medicine Board of Visitors Meeting. April 2014, Baltimore, MD.
9. *CMIT: The Center for Integrated Metabolic Imaging and Therapeutics*. University of Maryland Medical System Board Meeting. September 2014, Baltimore, MD.
10. *Clinical and Translational Applications of MR-guided Focused Ultrasound*. Annual Retreat of the Brain Science Research Consortium, University of Maryland School of Medicine, October 2014, Baltimore, MD.
11. *Advances in Brain Cancer Research at the NCI-Greenebaum Cancer Center*. Greenebaum Cancer Center Board Meeting, October 2014, Baltimore, MD.
12. *Launching a career as a surgeon-scientist*. Passano Clinician-Scientist Career Development Symposium, University of Maryland School of Medicine, March 2015, Baltimore, MD.
13. *Awake Craniotomy: Anesthetic & Surgical Considerations*. Department of Anesthesiology Grand Rounds, University of Maryland Medical Center, November 2015, Baltimore, MD.
14. *Clinical and Translational Applications of MR-guided Focused Ultrasound*. Festival of Science, University of Maryland School of Medicine. December 2015, Baltimore, MD.
15. *Developing a Career as a Clinician-Scientist*. University of Maryland - Summer Research Forum, July 2016, Baltimore, MD.
16. *Awake, Fluorescent-guided Surgery for Maximal Resection of Intrinsic Brain Tumors*, Department of Surgery Grand Rounds, University of Maryland School of Maryland, January 2017, Baltimore, MD.
17. *Focused Ultrasound-mediated Immunomodulation in Brain Tumors*, Tumor Immunology and Immunotherapy Program Retreat, University of Maryland Greenebaum Cancer Center, August 2017, Baltimore, MD
18. *Emerging Therapeutic Delivery Approaches in Neuro-oncology*, Johns Hopkins Department of Neurosurgery, Grand Rounds, August 2017, Baltimore, MD

19. *New Therapeutic Delivery Approaches in Neuro-Oncology*, Experimental Therapeutics Program Retreat, University of Maryland Greenebaum Cancer Center, September 2017, Baltimore, MD
20. *Ultrasound enhanced drug delivery in Neuro-oncology*, Experimental Therapeutics Program Retreat, University of Maryland Greenebaum Cancer Center, October 2018, Baltimore, MD
21. *Developing a Career as a Clinician-Scientist, Keynote address*, University of Maryland Medical Student Research Day, November 2018
22. *Sound Power: Using focused ultrasound to unlock barriers to treating brain disorders*. Visiting Professor, Johns Hopkins Hospital, March 2021
23. *Maryland Brain Tumor Research: Updates and New Directions*, Johns Hopkins Neurosurgery, Grand Rounds, May 2022
24. *Focused Ultrasound-enhanced Neurosurgery: Opening the window of opportunity for treating residual, infiltrating gliomas*. Johns Hopkins Biomedical Engineering, May 2024
25. Herman and Walter Samuelson Foundation Symposium in Stem Cell Research: *Targeting cell-neural interactions in GBM*. University of Maryland, Baltimore, MD October 2024

National/International

26. “*Challenges in Neuro-Oncology*”, Yale-New Haven Hospital, Neuro-Oncology Center, January 2011, New Haven, CT.
27. “*New Approaches to Drug Delivery for Intrinsic Brain Tumors*”, University of Virginia Department of Neurosurgery, Grand Rounds, February 2012, Charlottesville, VA.
28. “*Advances in Brain Tumor Therapies*”, Dartmouth-Hitchcock Medical Center, Neurosurgery and Neurology Grand Rounds, March 2012, Lebanon, NH.
29. *Advances in Neuro-Oncology Seminar*, Annual Meeting of the American Association of Neurological Surgeons, April 2013, New Orleans, LA.
30. *Brain Tumors: State of the Art Seminar*, Annual Meeting of the American Association of Neurological Surgeons, April 2014, San Francisco, CA.
31. *Developing a career as a neurosurgeon-scientist*. Temple University Department of Neurosurgery, March 2015, Philadelphia, PA.
32. *Brain Tumors: State of the Art Seminar*, Annual Meeting of the American Association of Neurological Surgeons, May 2015, Washington, D.C.
33. *Getting a K Award*. NIH-NINDS R25 Grant Workshop, June 2015, Bethesda, MD.
34. *Exciting Developments in Translational Neuroscience*, Great-Grand Conference, AAMC, September 2015, Baltimore, MD.
35. *Building a Career as a Neurosurgeon-Scientist*, Brown University Medical School, April 2016, Providence, RI.
36. *Brain Tumors: State of the Art Seminar*, Annual Meeting of the American Association of Neurological Surgeons, May 2016, Chicago, IL.
37. *New Therapeutic Delivery Approaches in Neuro-oncology*, International Conference on Cancer Research and Targeted Therapy, October 2016, Baltimore, MD.
38. *Update on the clinical application of MRgFUS for drug delivery to brain tumors*. Adult Brain Tumor Consortium, Spring Meeting, April 2017, Baltimore, MD.
39. *Brain Tumors: State of the Art Seminar*, Annual Meeting of the American Association of Neurological Surgeons, April 2017, Los Angeles, CA.
40. *Neuro-Oncology Applications of Therapeutic Ultrasound*. Brain Tumor Biotech Summit, Northwell-Hofstra Medicine, Lenox Hill Hospital, June 2017, New York, NY.

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41. *Emerging Therapeutic Delivery Approaches in Neuro-oncology*, Tisch-Duke Brain Tumor Center, March 2018, Durham, NC
42. *Brain Tumors: State of the Art Seminar*, Annual Meeting of the American Association of Neurological Surgeons, April 2018, New Orleans, LA.
43. *MRgFUS: Towards the next phase of development for neuro-applications*, InSightec Annual Board Meeting, May 2019, Miami, FL.
44. *Sound Power: Using focused ultrasound to unlock barriers to drug delivery in the brain*. Society for Image-Guided Neuro-interventions (SIGN) Annual Meeting 2019, Baltimore, MD.
45. *What clinical disease targets are ideal for FUS + immunotherapy combinations in GBM?* FUS Foundation-Cancer Research Institute Annual Meeting, July 2019, Arlington, VA
46. *Activating an immune response in glioblastoma: pulsed FUS*. FUS Foundation-Cancer Research Institute Annual Meeting, July 2019, Arlington, VA
47. *Transcranial ultrasound and harmonic dosing for controlled blood brain barrier opening in infiltrating gliomas*. American Academy of Neurological Surgeons, Annual Meeting (virtual), September 2020
48. *Sound Power: Using focused ultrasound to unlock barriers to drug delivery in the brain*. Virtual Visiting Professor, University of Texas, Austin, March 2021
49. *MRI-guided, acoustic emissions-informed, microbubble-enhanced ultrasound for controlled blood-brain barrier opening*, IEEE, International Ultrasonics Symposium, October 2021
50. *Developing a career as a neurosurgeon-scientist*. Congress of Neurological Surgeons K12 Webinar Series, December 2021
51. *Sound Power: Focused ultrasound and the emerging era of neurosonics in Neurosurgery*. Melvyn Gelch Lecture, Advanced Training of Neurosurgical Residents at Rhode Island Hospital-Brown Neurosurgery, May 2022
52. *MRI-guided Focused Ultrasound and the coming era of neurosonics in neurosurgery*, Society for Image-Guided Neurointerventions (SIGN), Warwick, UK, August 2022
53. *MRI-guided Focused Ultrasound and the coming era of neurosonics in neurosurgery*, University of Pennsylvania, Visiting Professor presentation, Philadelphia, PA, September 2022
54. *The Legacy of Dr. Ferenc Jolesz and the Emerging Era of Neurosonics*, The 8th International Symposium on Focused Ultrasound - Bethesda, MD October 2022
55. *Focused Ultrasound-enhanced Neurosurgery: Opening the window of opportunity for treating residual, infiltrating gliomas*. Seattle Science Foundation, John Jane Annual Visiting Surgeon Lectureship–November 2023
56. *Looking into the Future: Utility of AI-based models for defining localized therapy and monitoring of infiltrating gliomas*. Society for Neuro-Oncology Annual Meeting, November 2024

National & International Meetings

1. McGirt MJ, Thomas G, Woodworth GF, Williams M, Rigamonti D. Diagnosis, treatment and analysis of long-term outcomes in idiopathic normal pressure hydrocephalus. *Twelfth International Symposium on Intracranial Pressure and Brain Monitoring*. August, 2004, Hong Kong.
2. McGirt MJ, Woodworth GF, Thomas G, Miller N, Williams M, Rigamonti D. Frameless stereotactic ventriculoperitoneal shunting for pseudotumor cerebri: An outcomes comparison versus lumboperitoneal shunting. *Annual Meeting of the Congress of Neurological Surgeons*, October 2004, San Francisco, CA.

3. McGirt MJ, Woodworth GF, Coon A, Thomas G, Williams M, Rigamonti D. Ventriculoperitoneal shunting for idiopathic normal pressure hydrocephalus: Predictors of treatment response and analysis of long-term outcomes. *Annual Meeting of the Congress of Neurological Surgeons, October 2004, San Francisco, CA.*
4. McGirt MJ, Woodworth GF, Samdani A, Garonzik I, Alex Olivi, Weingart J. Frameless versus frame-based image-guided stereotactic brain biopsy in the diagnosis of glioma: Comparison of biopsy and open resection specimen. *Annual Meeting of the Congress of Neurological Surgeons, October 2004, San Francisco, CA.*
5. McGirt MJ, Woodworth GF, Frazier J, Coon A, Olivi A, Weingart J. Independent Predictors of morbidity after image-guided stereotactic brain biopsy: A risk assessment of 270 cases. *Annual Meeting of the Congress of Neurological Surgeons, October 2004, San Francisco, CA.*
6. Woodworth GF, McGirt MJ, Thomas G, Miller N, Williams M, Rigamonti D. Prior shunt failure or concurrent ventriculoperitoneal shunting increases the risk of endoscopic third ventriculostomy failure for the treatment of obstructive hydrocephalus in adults. *Annual Meeting of the Congress of Neurological Surgeons, October 2004, San Francisco, CA.*
7. Sciubba DM, Stuart RM, McGirt MJ, Woodworth GF, Samdani AF, Carson B, Jallo GI. Antibiotic-impregnated shunt catheters decrease the incidence of shunt infection in the treatment of hydrocephalus. *AANS/CNS Section on Pediatric Neurological Surgery, December 2004, San Francisco, CA.*
8. McGirt MJ, Perler BA, Brooke B, Jain S, Woodworth GF, Buck DW, Roseborough GS, Tamargo RJ, Coon A, Heller J, Freischlag JA, Williams GM. Statin use reduces the incidence of complications following carotid endarterectomy: A novel potential neuroprotective effect. *Annual Meeting of the Society of Vascular Surgery, 2005, Chicago, IL*
9. Coon AL, McGirt MJ, Woodworth GF, Munding GS, Foran MP, Colby GP, Huang J. Phenytoin therapy predicts improved functional outcome after acute subdural hematoma evacuation. *Annual Meeting of the American Association of Neurological Surgeons, April 2005, New Orleans, LA.*
10. McGirt MJ, Coon A, Woodworth GF, Buck D, Jain S, Perler B, Tamargo RJ. A Decade experience with carotid endarterectomy at the Johns Hopkins Hospital: An assessment of current surgical risks. *Annual Meeting of the Congress of Neurological Surgeons, October 2005, Boston, MA.*
11. McGirt MJ, Coon A, Woodworth GF, Buck D, Jain S, Perler B, Tamargo RJ. Statins, HMG CoA-reductase inhibitors, reduce the risk of perioperative stroke after carotid endarterectomy: A novel role for a potential neuroprotectant. *Annual Meeting of the Congress of Neurological Surgeons, October 2005, Boston, MA.*
12. McGirt MJ, Coon A, Woodworth GF, Buck D, Jain S, Perler B, Tamargo RJ. Selective versus routine intraluminal carotid artery shunting guided by intraoperative electroencephalography (EEG) and somatosensory evoked potential (SSEP) monitoring reduces the risk of perioperative stroke after carotid endarterectomy. *Annual Meeting of the Congress of Neurological Surgeons, October 2005, Boston, MA.*
13. McGirt MJ, Coon A, Woodworth GF, Buck D, Jain S, Perler B, Tamargo RJ. Surgeon frequency, not cumulative volume is associated with perioperative morbidity after carotid endarterectomy. *Annual Meeting of the Congress of Neurological Surgeons, October 2005, Boston, MA.*

14. McGirt MJ, Buck D, Woodworth GF, Sciubba D, Weingart J, Jallo G. Adjustable versus set-pressure valves decrease the risk of shunt failure in the treatment of pediatric hydrocephalus. *Annual Meeting of the Congress of Neurological Surgeons, October 2005, Boston, MA.*
15. Coon AL; McGirt MJ; Woodworth GF; Vogel T; Colby GP; Jallo GI. Outcomes following craniotomy for acute subdural hematoma evacuation in children: A pediatric trauma center experience. *Annual Meeting of the Congress of Neurological Surgeons, October 2005, Boston, MA.*
16. Coon AL; McGirt MJ; Woodworth GF; Munding GS; Foran M; Colby GP, Huang J. Independent predictors of outcome following acute subdural hematoma evacuation: A novel grading scale for outcome prediction. *Annual Meeting of the Congress of Neurological Surgeons, October 2005, Boston, MA.*
17. Coon AL; McGirt MJ; Woodworth GF, Colby GP; Munding GS, Foran M, Huang J. Chronic anticoagulation with warfarin is associated with decreased functional outcome and increased length of stay following craniotomy for acute subdural hematoma *Annual Meeting of the Congress of Neurological Surgeons, October 2005, Boston, MA.*
18. Woodworth GF, McGirt MJ, Thomas G, Williams M, Hillis A, Rigamonti D. Neuropsychological profile can predict cognitive response to CSF shunting for idiopathic normal pressure hydrocephalus. *Annual Meeting of the Congress of Neurological Surgeons, October 2005, Boston, MA.*
19. McGirt MJ, Woodworth GF, Sciubba D, Wolinski JP, Jallo GI, Gokaslan ZL. Predictors of cervical instability requiring fusion after cervical laminectomy for intradural tumor resection. *AANS/CNS Section on Disorders of the Spine and Peripheral Nerves Annual Meeting, February 2006, Orlando, FL.*
20. Coon A, McGirt MJ, Woodworth GF, Buck D, Jain S, Perler B, Tamargo RJ. Accuracy of carotid ultrasonography in the evaluation of carotid stenosis: a comparison to digital subtraction angiography in 631 consecutive cases. *Annual Meeting of the Cerebrovascular Section: Congress of Neurological Surgeons, February 2006, Kissimmee, FL.*
21. McGirt MJ, Coon A, Brooke B, Woodworth GF, Buck D, Jain S, Tamargo R, Perler B. Hyperglycemia independently increases the risk of perioperative stroke and death after carotid endarterectomy: Analysis of 1566 cases. *Annual Meeting of the Congress of Neurological Surgeons, October 2006, Chicago, IL.*
22. Sciubba DS, McGirt MJ, Woodworth GF, Jallo GI. Antibiotic-impregnated shunt catheters do not increase the incidence of late shunt infection in the treatment of hydrocephalus. *Annual Meeting of the Congress of Neurological Surgeons, October 2006, Chicago, IL.*
23. McGirt MJ, Woodworth GF, Chaichana KL, Attenello F, Carson BS, Jallo GI. Ventricular dilation is not a reliable measure of acute shunt failure in children having undergone multiple shunt revisions. *Annual Meeting of the Congress of Neurological Surgeons, October 2007, San Diego, CA.*
24. Woodworth GF, McGirt MJ, Gokaslan Z, Witham T, Jallo GI, Wolinski JP. Predictors of ambulatory function following surgical resection of intramedullary spinal cord tumors. *Annual Meeting of the Congress of Neurological Surgeons, October 2007, San Diego, CA.*
25. Than KD, Woodworth GF, Bettegowda C, McGirt MJ, Jallo GI, Rigamonti D. Adolescent age is an independent predictor of improved outcome following endoscopic third ventriculostomy for the treatment of hydrocephalus. *Annual Meeting of the Congress of Neurological Surgeons, October 2007, San Diego, CA.*
26. Woodworth GF, Baird CJ, Garcia-Ambrossi G, Tonascia J, Tamargo RJ. Inaccuracy of the administrative database: comparative analysis of two databases for the diagnosis and

- treatment of intracranial aneurysms. Top Ten Abstract, *Annual Meeting of the Congress of Neurological Surgeons, October 2009*, New Orleans, LA.
27. Woodworth GF, See A, Bettegowda C, Jallo G, Rigamonti D. Predictors of outcome following adult endoscopic third ventriculostomy. *Annual Meeting of the American Association of Neurological Surgeons, May 2010, Philadelphia, PA.*
 28. See A, Woodworth GF, Bettegowda C, Jallo G, Rigamonti D. Predictors of outcome following pediatric endoscopic third ventriculostomy. *Annual Meeting of the American Association of Neurological Surgeons, May 2010, Philadelphia, PA.*
 29. See A, Jackson C, Garzon-Muvdi T, Woodworth GF, Tamargo RJ. Facial nerve function following vestibular Schwannoma resection: Correlation with final nerve stimulation voltage. *Congress of Neurological Surgeons Annual Meeting, October 2010.*
 30. See A, Jackson C, Garzon-Muvdi T, Woodworth GF, Tamargo RJ. Facial nerve function following vestibular Schwannoma resection: Correlation with tumor dimensions. *Congress of Neurological Surgeons Annual Meeting, October 2010, San Francisco, CA.*
 31. Woodworth GF, Garzon-Muvdi T, Blakeley J, Burger P, Weingart JD. Degree of treatment effect is independently associated with survival in recurrent glioblastoma. *Congress of Neurological Surgeons Annual Meeting, October 2010, San Francisco, CA.*
 32. Link T, Woodworth GF, Chaichana KL, Mayer SA, Grossman RS, Quinones-Hinojosa A. Hyperglycemia is independently associated with post-operative function loss in primary glioblastoma. *Annual Meeting of the American Association of Neurological Surgeons, April 2011, Denver, CO.*
 33. Link T, Woodworth GF, Chaichana KL, Mayre SA, Grossman RS, Quinones-Hinojosa A. Immediate post-operative deficits delay treatment initiation and decrease overall survival in primary glioblastoma. *Annual Meeting of the American Association of Neurological Surgeons, April 2011, Denver, CO.*
 34. Hersh D, Schneider C, Kim AJ, Tran N, Winkles JA, Woodworth GF. Fibroblast-inducible factor 14 correlates with isocitrate dehydrogenase mutation status in patient glioma specimens. *Annual Meeting of the American Association of Neurological Surgeons, April 2014, San Francisco, CA.*
 35. Hersh D, Schneider C, Kim AJ, Tran N, Winkles JA, Woodworth GF. Fibroblast-inducible factor 14 correlates with molecular subclasses in patient glioma specimens. *Annual Meeting of the American Association of Neurological Surgeons, April 2014, San Francisco, CA.*
 36. Aniket S, Wadajkar, Jimena G. Dancy, Nina P. Connolly, Jeffrey A. Winkles, Graeme F. Woodworth, Anthony J. Kim (2017) Targeting Nanotherapeutics to the Invasive Glioblastoma Margin via the Cell Surface Receptor Fn14, *American Association of Cancer Research (AACR) Annual Meeting 2017*, Washington, D.C., USA
 37. Jimena G. Dancy, Aniket S. Wadajkar, Graeme F. Woodworth, Jeffrey A. Winkles, Anthony J. Kim (2017) Optimizing Nanoparticle Surface Properties Using SPR for Improved Therapeutic Efficacy Against Triple-negative Breast Cancer Tumors, *American Association of Cancer Research (AACR) Annual Meeting 2017*, Washington, D.C., USA
 38. Connolly NP, Schneider CS, Shetty A, Xu S, Ozawa T, Kim AJ, Winkles JA, Holland EC, Woodworth GF(2017) PDGF-A overexpression and p53 depletion in rat neural precursor cells induces large brain tumors that resemble human glioblastoma, *American Association of Cancer Research (AACR) Annual Meeting 2017*, Washington, D.C., USA
 39. Hersh DS, Harder BG, Roos A, Peng S, Heath JE, Legesse T, Kim AJ, Woodworth GF, Tran NL, Winkles JA. The TNF receptor family member Fn14 is highly expressed in recurrent glioblastoma (GBM) and in GBM patient-derived xenografts with acquired temozolomide resistance. *Congress of Neurological Surgeons Annual Meeting, October 2018.*

40. Anastasiadis P, Connolly NP, Frank JA, Woodworth GF, Frenkel V. (2019) MR-guided focused ultrasound for the safe disruption of the blood-brain barrier in brain tumors. *Blood-Brain Barrier annual meeting, Cold Spring Harbor Laboratory*. Cold Spring Harbor, NY.
41. Anastasiadis P, Connolly N, Mohammadabadi A, Frank JA, Woodworth GF, Frenkel V. (2018) Towards a model of FUS-mediated blood-brain barrier disruption in non-enhancing, glioma-invaded brain regions for testing improvements in therapeutic delivery. *6th International Symposium on Focused Ultrasound*. Reston, VA
42. Anastasiadis P, Younger K, Roberts NB, Frank JA, Frenkel V, Davila E, Woodworth GF. (2018) Acoustic activation of the glioma-brain microenvironment. American Association of Cancer Research (AACR) Annual Meeting, Chicago, IL
43. Anastasiadis P, Younger K, Roberts NB, Frenkel V, Davila E, and Woodworth GF. (2017) Acoustic activation of the glioma-brain microenvironment for improved T-cell immunotherapy. Cancer Biology Training Consortium meeting; Stevenson, WA
44. Frenkel V, Hersh DS, Anastasiadis P, Mohammadabadi A, Guo S, Winkles JA, Kim AJ, Gullapalli R, Keller A, Woodworth GF. (2017) Pulsed focused ultrasound effects on the extracellular spaces in the brain. IEEE International Ultrasonics Symposium; Washington D.C. (oral).
45. Mohammadabadi A, Hersh DS, Anastasiadis P, Smith PC, Woodworth GF, Kim AJ, Frenkel V. (2017) Focused ultrasound for augmenting convection-enhanced delivery of nanoparticles in the brain. Acoustical Society of America (ASA) Meeting, Boston, MA
46. Pavlos Anastasiadis, Nina P. Connolly, Heather M. Ames, Pranjali Kanvinde, Adarsha Malla, Anthony J. Kim, Jeffrey A. Winkles, Graeme F. Woodworth. (2020) Spatial and temporal control of molecular transformations in glial and progenitor cells using the RCAS/tv-a system. *Glia in Health and Disease Conference*, Cold Spring Harbor Laboratory, Cold Spring Harbor, NY
47. *EANO/SNO Joint Session: Focused Ultrasound*. Moderator and Closing Remarks, Society for Neuro-Oncology Annual Meeting, Vancouver, BC November 2023
48. *ASCO Annual Meeting 2023*, Multicenter Study of Low-intensity Focused Ultrasound With Systemic Microbubble Oscillators for Blood-brain Barrier Disruption for Liquid Biopsy in Glioblastoma (LIBERATE),

Regional Meetings

1. Woodworth GF, McGirt MJ, Thomas G, Williams M, Rigamonti D. Prior shunt failure or concurrent ventriculoperitoneal shunting increases the risk of endoscopic third ventriculostomy failure in the treatment of obstructive hydrocephalus. *Annual Meeting of the Southern Society of Neurological Surgeons, March 2004, Amelia Island, FL*.
2. McGirt MJ, Woodworth GF, Miller N, Williams M, Rigamonti D. Cerebrospinal fluid shunting for pseudotumor cerebri: Predictors of treatment response and analysis of long-term outcomes. *Annual Meeting of the Southern Society of Neurological Surgeons, March 2004, Amelia Island, FL*.
3. McGirt MJ, Woodworth GF, Thomas G, Williams M, Rigamonti D. Independent predictors of endoscopic third ventriculostomy failure in the treatment of hydrocephalus. *Annual Meeting of the Southern Society of Neurological Surgeons, March 2004, Amelia Island, FL*.
4. Brooke BS, Heller JA, Chang DC, Matsen SL, McGirt MJ, Coon A, Jain S, Woodworth GF, Roseborough GS, Freischlag JA, Perler BA. Presentation and postoperative outcomes of

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- carotid endarterectomy in African Americans at a high-volume hospital. *Annual Meeting of the Eastern Vascular Society, May 2005, Pittsburgh, PA.*
5. Sciubba DS, McGirt MJ, Woodworth GF, Jallo GI. Antibiotic-impregnated shunt catheters do not increase the incidence of late shunt infection in the treatment of hydrocephalus. *Annual Meeting of the Southern Society of Neurological Surgeons, March 2007, Sea Island, GA.*
 6. McGirt MJ, Buck D, Woodworth GF, Sciubba D, Weingart J, Jallo G. Adjustable versus set-pressure valves decrease the risk of shunt failure in the treatment of pediatric hydrocephalus. *Annual Meeting of the Southern Society of Neurological Surgeons March 2007, Sea Island, GA.*
 7. McGirt MJ, Woodworth GF, Chaichana K, Gokaslan Z, Jallo GI. Predictors of neurological outcome and progressive spinal deformity after resection of intramedullary spinal cord tumors in 80 consecutive patients. *Annual Meeting of the Southern Society of Neurological Surgeons March 2007, Sea Island, GA.*
 8. Anastasiadis P, Connolly NP, Frank JA, Woodworth GF, Frenkel V. (2019) MRI-guided focused ultrasound-mediated blood-brain barrier in glioblastoma for the targeted delivery of diagnostic and therapeutic formulations. Maryland Neuroimaging Retreat: Functional Neuroimaging of Brain Development, Disorders & Disease. Baltimore, MD (poster).
 9. Anastasiadis P, Connolly N, Mohammadabadi A, Hersh DS, Winkles JA, Kim AJ, Woodworth GF, Frenkel V. (2018) Targeted delivery of therapeutics through the blood-brain barrier enabled by transcranial pulsed focused ultrasound. Annual Cancer Research Day, Baltimore, MD
 10. Anastasiadis P, Mohammadabadi A, Shen WB, Smith JA, Hersh DS, Winkles JA, Yarowsky PJ, Kim AJ, Woodworth GF, Fishman PS, Frenkel V. (2018) Non-invasive targeted delivery of therapeutics in the brain by MRI-guided focused ultrasound. Maryland Neuroimaging Retreat: molecular and physiological basis of brain signals, Baltimore, MD
 11. Anastasiadis P, Connolly N, Frank JA, Woodworth GF, Davila E, Frenkel V. (2018) MR-guided focused ultrasound: a non-invasive therapeutic modality for glioblastoma. 9th Cancer Biology Research Retreat, Baltimore, MD

Courses, Workshops, & Seminars Attended

1. Neurosurgeon Research Career Development Program Retreat 2012, 2013, 2014
2. *Brain Tumors: State of the Art Seminar*, Annual Meeting of the American Association of Neurological Surgeons, 2013, 2014, 2015, 2016, 2017, 2018
3. “*Conflicts of Interest in Biomedical Research Seminar*”, CIPP 907, UMSOM, 2014, 2015, 2016, 2017, 2018
4. “*Transitioning from K to R Grants: Lessons learned*”. Faculty Career Development Program, University of Maryland School of Medicine, January 2015
5. Goodman Oral Board Review course, Houston, TX, May 2015.
6. “*NIH-NINDS R25 Grant Workshop*”, Bethesda, MD, June 2015
7. “*Writing an NIH Biosketch*”, Faculty Career Development Program, University of Maryland School of Medicine, January 2016
8. “*Ultrasound Immunomodulation for Brain Cancer*” Focused Ultrasound Foundation Workshop, February 2016, Charlottesville, VA
9. “*K-club*”, Faculty Career Development Program, University of Maryland School of Medicine, June 2016

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10. *“Introduction to Clinical and Translational Research”*, University of Maryland, Baltimore, August 2016
11. *Tumor Satellite Symposium - panelist*, Congress of Neurological Surgeons Annual Meeting, September 2016, San Diego, CA.
12. *Research Summit: Building a Sustainable Neurosurgeon Research Environment*, Congress of Neurological Surgeons Annual Meeting, September 2016, San Diego, CA.
13. *“Ultrasound-based Immunomodulation for Brain Cancer”* Focused Ultrasound Foundation Workshop, October 2016 Alexandria, VA
14. *“How to write an NIH grant”*, Faculty Career Development Program, University of Maryland School of Medicine, October 2016
15. *“Writing an NIH grant: Things I wish I knew as a junior faculty member”*, Faculty Career Development Program, University of Maryland School of Medicine, January 2017
16. *“Are you ready to write a R01?”*. Faculty Career Development Program, University of Maryland School of Medicine, May 2017
17. *“Cancer Biology Retreat”*, University of Maryland Greenebaum Comprehensive Cancer Center, June 2017
18. *“Maintaining Morale and Succeeding in Research During Challenging Times”* Faculty Career Development Program, University of Maryland School of Medicine, July 2017
19. *Comparative Oncology Consortium Symposium*, NIH, Bethesda, MD September 2017
20. *Focused ultrasound blood brain barrier disruption for glioblastoma*, Focused Ultrasound Foundation, Washington, D.C. November 2017
21. *NCI – Innovative Molecular Analysis Technologies investigators meeting*, NCI Shady Grove, Rockville, MD, December 2017
22. *Gamma Knife Radiosurgery Training Program*, University of Pittsburgh Medical Center, 2019