### **CURRICULUM VITAE**

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**Place of Birth:** Los Angeles, CA

#### **Education**

1991	B.A. (cum laude)	Russian and Biology	Amherst College
1997	Ph.D.	Pathobiology	University of Southern California
		Advisor: Alan L. Enstein, M	.D., Ph.D.

1999 M.D. Medicine University of Southern California

### **Postdoctoral Training**

1999-2003	Clinical Fellow	Pathology	Harvard Medical School
1999-2001	Resident	Anatomic Pathology	Brigham and Women's Hospital
2001 (July-Sept.)	Fellow	Gynecologic Pathology	Brigham and Women's Hospital
2001 (OctDec.)	Chief Resident	Anatomic Pathology	Brigham and Women's Hospital
2002 (JanMar.)	Fellow	Soft Tissue Pathology	Brigham and Women's Hospital
2002 (AprJune)	Fellow	Hematopathology	Brigham and Women's Hospital
2002-2003	Fellow	Gastrointestinal Pathology	Brigham and Women's Hospital

# **Academic Appointments**

2003-2005	Instructor	Pathology	Harvard Medical School
2005-2009	<b>Assistant Professor</b>	Pathology	Harvard Medical School
2009-2017	<b>Associate Professor</b>	Pathology	Harvard Medical School
2017-present	Professor	Pathology	Harvard Medical School

# Appointments at Hospitals/Affiliated Institutions

2003-2009	Associate Pathologist	Pathology	Brigham and Women's Hospital
2009-present	Pathologist	Pathology	Brigham and Women's Hospital
2005-present	Consultant	Pathology	Dana-Farber Cancer Institute
2005-2009	Consultant	Pathology	Children's Hospital Boston

# **Major Administrative Leadership Positions**

2007-present	Director, Immunohistochemistry Laboratory, Department of Pathology, Brigham and Women's Hospital
2009-2013	Associate Director of Surgical Pathology, Brigham and Women's Hospital
2009-present	Co-Director, Surgical Pathology Update Course, Brigham and Women's Hospital
2013-present	Director of Surgical Pathology, Brigham and Women's Hospital

# **Local Committee Service**

2003-present	Resident Recruitment and Selection Committee, Department of Pathology, Brigham and Women's Hospital
2009-present	Chair, Surgical Pathology Quality Assurance Committee, Department of Pathology, Brigham and Women's Hospital
2009-present	Education Committee, Department of Pathology, Brigham and Women's Hospital
2009-present	Executive Committee, Brigham and Women's Hospital Mastocytosis Center
2012-2013	Standing Committee on Continuing Education, Harvard Medical School
2013-present	Clinical Operations Committee, Department of Pathology, Brigham and Women's Hospital
2013-present	Steering Committee, Center for Esophageal and Gastric Cancer, Dana Farber/Brigham and Women's Cancer Center
2013-present	Center for Cancer Precision Medicine, Dana Farber Cancer Institute
2014-present	Steering Committee, Pancreaticobiliary Tumor Center, Dana Farber/Brigham and Women's Cancer Center
2014-present	Co-Chair, Tissue Committee, Brigham and Women's Hospital

2016-present	Cancer Committee, Dana Farber/Brigham and Women's Cancer Center
2016-present	Steering Committee, Profile project, Dana Farber/Brigham and Women's Cancer Center

# **National Committee Service**

2014-2017	Soft Tissue Sarcoma Expert Panel member, American Joint Committee on Cancer Staging System
2014-2017	Sarcoma Analysis Working Group member, The Cancer Genome Atlas (TCGA)
2015-present	Test Development and Advisory Committee for Anatomic Pathology, American Board of Pathology

# **International Committee Service**

2012	W.H.O. Classification of Tumors of Soft Tissue and Bone, 4 <sup>th</sup> edition, Consensus and Editorial Working Group member
2012	Consensus Meeting on Classification and Diagnostic Criteria for Mastocytosis, Working Group member
2018	W.H.O. Classification of Tumors of Soft Tissue and Bone, 5 <sup>th</sup> edition, Editorial Board expert member

# **Professional Societies:**

2000-present	College of American Pathologists
2009-2017	Member, Immunohistochemistry Committee
2011-2012	Vice Chair, Immunohistochemistry Committee
2013-2017	Chair, Immunohistochemistry Committee
2000-present	United States and Canadian Academy of Pathology
2009	Abstract Review Committee (Gastrointestinal Pathology)
2010, 2011	Moderator, Bone and Soft Tissue Pathology platform sessions
2010-present	Member, Education Committee
2012-2017	Chair, Abstract Review Board and Abstract Assignment Committee
2013, 2014	Moderator, Gastrointestinal Pathology platform session
2015-2017	Moderator, Bone and Soft Tissue Pathology specialty conference
2017-2020	Chair, Education Committee
2017-2020	Director, Interactive Microscopy Soft Tissue Pathology course
2018-2020	Co-Director, Diagnostic Pathology Update course
2000-present	American Society for Clinical Pathologists
2002-present	American Gastroenterological Association
2002-present	American College of Gastroenterology
2004-present	New England Society of Pathologists

2004-present International Society of Bone & Soft Tissue Pathology

2015-present Officer At-Large

2005-present Gastrointestinal Pathology Society

Arthur Purdy Stout Society of Surgical Pathologists 2009-present

Co-Chair, Program Committee 2011-2016

2011-present Member, Council

2017-present Chair, Membership Committee

2010-present Association of Directors of Anatomic and Surgical Pathology (ADASP)

2014-present Member, Council

2016-present Pancreatobiliary Pathology Society

2016-present Histiocyte Society

### **Editorial Activities**

#### • Ad hoc Reviewer

Acta Pathologica Microbiologica et Head and Neck Pathology Immunologica Scandinavica Histology and Histopathology Acta Neuropathologica **Inflammatory Bowel Diseases** 

American Journal of Dermatopathology International Journal of Infectious Diseases

American Journal of Hematology International Journal of Pediatric

American Journal of Gastroenterology Otorhinolaryngology

American Journal of Pathology Journal of Allergy and Clinical Immunology Archives of Dermatology Journal of Cellular and Molecular Medicine

Archives of Pathology and Laboratory Medicine Journal of Clinical Pathology Blood Journal of Cutaneous Pathology

Journal of Molecular Diagnostics **BMC** Gastroenterology

**BMC** Oncology Journal of Pathology

**BMC Surgery** Journal of the European Academy of Dermatology and Venereology Brain

Laboratory Investigation British Journal of Dermatology

Lancet Oncology Cancer

**Cancer Genetics** The Oncologist

Clinical Cancer Research **Pathology** 

Pathology Research International Dermatology Diagnostic Cytopathology Pathology Research and Practice

Endocrine PLoS One

**Future Oncology** Transplant Infectious Disease Gastrointestinal Endoscopy World Journal of Gastroenterology

World Journal of Gastrointestinal Oncology Genes Chromosomes Cancer

World Journal of Gastrointestinal Surgery Head & Neck

#### Editorial Roles

American Journal of Clinical Pathology 2007-present Editorial Board

2008-present Editorial Board Applied Immunohistochemistry & Molecular Morphology

Diagnostic Histopathology, Symposium on Soft Tissue Tumors **Guest Editor** 2008

2009-present	Editorial Board	American Journal of Surgical Pathology
2010-present	Editorial Board	Human Pathology
2010-present	Associate Editor	Advances in Anatomic Pathology
2012-present	Regional Editor (1	North America) Histopathology
2012-present	Section Editor (Su	argical Pathology) Pathobiology of Human Disease (Elsevier)
2012-present	Associate Editor	Sternberg's Diagnostic Surgical Pathology (Lippincott)
2013	Guest Editor	Surgical Pathology Clinics (Gastrointestinal Pathology issue)
2013-present	Associate Editor,	Endocrine Pathology Histopathology
2013-present	Editorial Board	International Journal of Surgical Pathology
2013-present	<b>Editorial Board</b>	Seminars in Diagnostic Pathology
2014-present	Associate Editor,	Soft Tissue Pathology Histopathology
2014	Guest Editor	Histopathology (Annual Review Issue: Soft Tissue Tumors)
2014-2015	Guest Editor	Seminars in Diagnostic Pathology (Immunohistochemistry)
2014-present	Editorial Board	Modern Pathology
2015-present	Consulting Editor	Surgical Pathology Clinics
2016-2017	Guest Editor	Histopathology (Annual Review Issue: Surgical Pathology
		of 21st Century Medicine)
2016-present	Executive Adviso	ry Board Archives of Pathology and Laboratory Medicine
2016-present	Editorial Board	Virchows Archiv: The European Journal of Pathology
2016-present	Associate Editor	American Registry of Pathology (formerly Armed Forces
		Institute of Pathology) Atlases

### **Honors and Prizes**

1990	Research Fellowship, American Heart Association
1995-1996	Charles Heidelberger Memorial Scholarship, University of Southern California/
	Norris Comprehensive Cancer Center, Cancer Research
1997	Louis B. Silverman Memorial Award, Health Physics Society, Cancer Research
1997	Clinical Research Scholar Award, American Association for Cancer Research-
	Glaxo Wellcome Oncology
1997-1999	Dean's Scholar, University of Southern California School of Medicine
1999	Phi Kappa Phi All-University Honor Society, University of Southern California
2007	Pier F. Paci Memorial Award for Excellence in Teaching, Brigham and Women's
	Hospital, Department of Pathology
2012	Arthur Purdy Stout Society of Surgical Pathologists Annual Prize, in recognition
	of significant career achievements in surgical pathology under the age of 45 years
2014	Gastrointestinal Pathology Society Jack Yardley Investigator Award, in
	recognition of seminal contributions that advance the field of GI pathology

# **Report of Funded and Unfunded Projects**

# **Past Unfunded Projects**

2005-2012 PI Biomarkers in pancreatic and gastrointestinal neuroendocrine tumors

I studied the diagnostic and predictive value of novel biomarkers for well-differentiated neuroendocrine tumors of the pancreas and gastrointestinal tract.

2010-2012 PI HER2/neu and ER in gastroesophageal adenocarcinomas I compared the sensitivity of traditional rabbit polyclonal and mouse monoclonal antibodies to novel rabbit monoclonal antibodies in gastric and esophageal adenocarcinomas.

2012-2014 PI BRAF V600E immunohistochemistry
I evaluated the specificity of a monoclonal antibody for V600E-mutant BRAF in various tumor types.

### **Current Unfunded Projects**

2003-present PI Clinicopathologic study of soft tissue tumors
I am characterizing the histologic and clinical features of soft tissue tumors in
order to define clinical behavior and pathologic predictors of outcome.

2006-present PI Histiocytic and dendritic cell sarcomas
I am studying the clinical and pathologic features of histiocytic and dendritic cell sarcomas, evaluating pathologic predictors of outcome, and investigating the genetic alterations underlying their pathogenesis.

2010-present PI Novel diagnostic markers for sarcomas
I am evaluating the potential diagnostic utility of novel immunohistochemical markers for soft tissue tumors.

2011-present PI Mastocytosis and mast cell sarcoma
I am studying the clinical, histologic, and genomic features of cutaneous and systemic mastocytosis and mast cell sarcoma and evaluating novel diagnostic markers and potential prognostic indicators.

2012-present PI Succinate dehydrogenase-deficient tumors
I am investigating clinical and pathologic features and mechanisms of
tumorigenesis in gastrointestinal stromal tumors and renal cell carcinomas
characterized by succinate dehydrogenase inactivation.

# **Report of Local Teaching and Training**

### **Teaching of Students in Courses**

2001-2003 HMS PA501.23, Harvard Medical Student Clinical Clerkship in Pathology, Brigham and Women's Hospital 3<sup>rd-</sup> and 4<sup>th-</sup>year Medical Students Instructor 1-hr session monthly

2002-2009 HST-120, Gastrointestinal Pathophysiology, Harvard Medical School 1<sup>st-</sup>year Medical Students Laboratory Instructor 1-hr session weekly

# Formal Teaching of Residents, Clinical Fellows and Research Fellows

2001-2003	Pathology/Oncology Conference Pathology and Oncology Fellows	BWH/DFCI	30-min lecture quarterly
2002-2003	Inflammatory Bowel Disease Working Pathology, Gastroenterology Fellow	•	1-hr session bimonthly
2002-2003	Gastrointestinal Clinicopathologic C Pathology, Gastroenterology Fellow		1-hr session monthly
2003-present	Pancreatic Tumors Pathology Residents and Fellows	BWH	1-hr lecture
2003-present	Introduction to Immunohistochemist Pathology Residents and Fellows	ry BWH	1-hr lecture
2003-2014	Non-epithelial Tumors of the Gastro Pathology Residents and Fellows	intestinal Tract BWH	1-hr lecture
2006	Pathology of Allergy and Immunology Allergy and Immunology Fellows	gy BWH	1-hr lecture
2008-present	Gastrointestinal Cancer Center Conf Oncology Fellows and Staff	erence DFCI	1-hr session bimonthly
2010-present	Quality Assurance and Surgical Path Pathology Residents and Fellows	nology Reporting BWH	1-hr lecture
2013-present	An Introduction to Oncologic Pathol Medical Oncology Fellows	logy DFCI	1-hr lecture
2015-present	Methods in Clinical Research: Biom Oncology Fellows	arker Analysis DFCI	1-hr lecture
2015	An Introduction to Oncologic Pathol Radiation Oncology Fellows	ogy BWH	1-hr lecture
2015-present	Inflammatory Disorders of the Tubal Pathology Residents and Fellows	l Gut BWH	1-hr lecture
2016-present	Spindle Cell Tumors of Soft Tissue Pathology Residents and Fellows	BWH	1-hr lecture
2016-present	Pleomorphic Soft Tissue Tumors Pathology Residents and Fellows	BWH	1-hr lecture

# **Clinical Supervisory and Training Responsibilities**

2003-2009	Hematopathology Resident/Fellow Preceptor	BWH	2-4 hrs/day; 8 wks/yr
2005-2009	Gastrointestinal Pathology Fellow Preceptor	СНВ	1-2 hrs/day; 6 wks/yr
2003-present	Surgical Pathology, Gastrointestinal Patholog Resident/Fellow Preceptor	gy, and Soft T BWH	issue Tumor Pathology 1-4 hrs/day; 32 wks/yr

**Formally Supervised Trainees and Faculty** (All held Research Fellow or Clinical Fellow appointments at HMS)

appointments at HMS)			
2005-2006 Amitabh Srivastava, M.D. Published one manuscript	Associate Director of Surgical Pathology Brigham and Women's Hospital		
2005-2006 Hongbo Yu, M.D., Ph.D. Published two manuscripts	Director of Hematology Laboratory UMass Medical School, Worcester, MA		
2005-2007 Hejin P. Hahn, M.D., Ph.D. Published two manuscripts	Staff Pathologist Virginia Mason Hospital, Seattle, WA		
2006-2007 Sandro Santagata, M.D., Ph.D. Published one manuscript	Staff Neuropathologist Brigham and Women's Hospital		
2006-2007 Briana Gleason, M.D. Published two manuscripts	Staff Pathologist PathGroup, Nashville, TN		
2007-2008 Travis J. Hollmann, M.D., Ph.D. Published two manuscripts	Staff Dermatopathologist Memorial Hospital, New York, NY		
2007-2008 Joanna A. Gibson, M.D., Ph.D. Published one manuscript	Staff Pathologist Yale University, New Haven, CT		
2007-2008 Derek K. Marsee, M.D., Ph.D.	Staff Pathologist		
Published one manuscript	Diagnostic Pathology Medical Group, Sacramento, CA		
2008-2010 Kevin B. Long, M.D. Published three manuscripts	Staff Pathologist Cellnetix, Olympia, WA		
2008-2009 Lynette M. Sholl, M.D. Published two manuscripts	Chief, Pulmonary Pathology Service Brigham and Women's Hospital		
2008-2009 Dominique Coco, M.D. Published one manuscript	Staff Pathologist Cellnetix, Olympia, WA		

2009-2010 Published one	Wai Chin (Tim) Foo, M.D. e manuscript	Assistant Professor M.D. Anderson Cancer Center, Houston, TX
2009-2011 Published one	Tanya Rege, M.D., Ph.D. manuscript	Staff Pathologist Miraca Life Sciences, Newton, MA
2010-2011 Published two	Adrian Mariño-Enríquez, M.D. manuscripts	Instructor in Pathology Brigham and Women's Hospital
2010-2011 Published one	Dick Hwang, M.D., Ph.D. manuscript	Staff Pathologist Virginia Mason Hospital, Seattle, WA
2011-2012 Published one	Benjamin Chen, M.D., Ph.D. manuscript	Staff Pathologist UMass Medical Center, Worcester, MA
2010-2012 Published three	Leona A. Doyle, M.D. ee manuscripts	Staff Pathologist Brigham and Women's Hospital
2012-2013 Published one	Cheryl A. Adackapara, M.D. manuscript	Staff Pathologist Mid-Atlantic Permanente Medical Group, Rockville, MD
2012-2015 Published two	Emily F. Mason, M.D., Ph.D. manuscripts	Staff Hematopathologist Vanderbilt University, Nashville, TN
2012-2013 Published one	James R. Conner, M.D., Ph.D. manuscript	Staff Pathologist Mount Sinai Hospital, Toronto, Canada
2013-2014 Published one	Marina Vivero, M.D. manuscript	Staff Pathologist Brigham and Women's Hospital
2014-2015 Published one	Gabriel K. Griffin, M.D. manuscript	Hematopathology Fellow Brigham and Women's Hospital
2015-2016 Published three	Inga-Marie Schaefer, M.D. ee manuscripts	Pathology Resident Brigham and Women's Hospital
2015-2016 Published fou	Yin P. Hung, M.D., Ph.D. r manuscripts	Pathology Resident Brigham and Women's Hospital
2016-2017 Published one	Juliana Andrici, M.B.B.S. e manuscript	Pathology Resident Brigham and Women's Hospital

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

2005-2010	Diagnosis and differential diagnosis of solid pancreatic tun Gastrointestinal, Liver and Pancreatic Pathology	nors Single presentation Harvard Medical School
2006	Myoepithelial and nerve sheath tumors: An update Dermatopathology Update	Single presentation Harvard Medical School
2008	Gastrointestinal stromal tumors: An update Gastrointestinal, Liver and Pancreatic Pathology	Single presentation Harvard Medical School
2008-2010	Virtual slide seminar Gastrointestinal, Liver and Pancreatic Pathology	Single presentation Harvard Medical School
2008	Myoepithelial tumors and their mimics Bone and Soft Tissue Pathology for the Surgical Pathologis	Single presentation st Harvard Medical School
2009-2013	GIST and other mesenchymal tumors of the GI tract Gastrointestinal, Liver and Pancreatic Pathology	Single presentation Harvard Medical School
2010	What do you need to know about pathology in IBD? Inflammatory Bowel Disease: The Art and Science in the I in 2010  Boston University	Single presentation Diagnosis and Treatment rsity School of Medicine
2013, 2015	Pathology of colon polyps and cancer Comprehensive Review of Colon and Rectal Surgery	Single presentation Harvard Medical School
2014-present	Gastrointestinal stromal tumors: An update Gastrointestinal, Liver and Pancreatic Pathology	Single presentation Harvard Medical School
2015	Gastrointestinal stromal tumors: An update; Metastatic carcinoma of unknown primary: Diagnostic approach using immunohistochemistry; An approach to cutaneous spindle cell tumors; An approach to spindle cell tumors of deep soft tissue; An approach to pleomorphic and epithelioid soft tissue tumors Single presentation Surgical Pathology for the Practicing Pathologist Harvard Medical School	
2015	Pathology of inflammatory bowel disease Board Review in Gastroenterology	Single presentation Harvard Medical School
2017	Colorectal polyps: A practical approach; Metastatic carcinoma of unknown primary: Diagnostic approach using immunohistochemistry; The most common spindle cell tumors of soft tissue: Key features and differential diagnosis; Subclassification of pleomorphic sarcomas: How and why should we care?  Single presentation	
	Surgical Pathology for the Practicing Pathologist	Harvard Medical School

2018 (scheduled) Mesenchymal tumors of the GI tract (other than GIST) Single presentation
Gastrointestinal, Liver and Pancreatic Pathology Harvard Medical School

2018 (scheduled) Beyond lineage: Diagnostic and predictive molecular immunohistochemistry for surgical pathologists; Carcinoma of unknown primary: Diagnostic approach using immunohistochemistry

Current Concepts in Surgical Pathology

Harvard Medical School

# **Local Invited Presentations**

2004	Applications of immunohistochemistry for diagnostic surgical pathology / Invited lecture Department of Pathology, Children's Hospital Boston
2005	Immunohistochemistry in surgical pathology: An update / Invited lecture Department of Pathology, Children's Hospital Boston
2006	Classification of nerve sheath tumors / Invited lecture Department of Pathology, Children's Hospital Boston
2006	Surgical Pathology Update: Myoepithelial and nerve sheath tumors of soft tissue and skin / Invited lecture Department of Pathology, Brigham and Women's Hospital
2006	Gastrointestinal stromal tumors / Invited lecture Department of Pathology, Children's Hospital Boston
2009	Mast Cell Activation Seminar: CD25 expression in mast cell activation syndromes: A diagnostic marker of systemic mastocytosis at extramedullary sites / Invited lecture Brigham and Women's Hospital
2010	Surgical Pathology Update: Mesenchymal tumors of the gastrointestinal tract / Invited lecture Department of Pathology, Brigham and Women's Hospital
2013	Gastrointestinal pathology: Biopsy diagnosis of inflammatory disorders / Invited lecture Division of Gastroenterology, Brigham and Women's Hospital
2013	Surgical Pathology Update: Succinate dehydrogenase deficiency and tumorigenesis / Invited lecture Department of Pathology, Brigham and Women's Hospital
2014	Center for Advanced Molecular Diagnostics Clinical Conference: Soft tissue tumor pathology: an update on classification and molecular genetics including "next generation" immunohistochemistry / Invited lecture Department of Pathology, Brigham and Women's Hospital

2014	Pathology of colon polyps and cancer / Invited lecture Division of Gastroenterology, Brigham and Women's Hospital
2016	Gastrointestinal lymphomas: An update / Invited lecture Division of Gastroenterology, Brigham and Women's Hospital
2016	The evolution of immunohistochemistry for soft tissue tumors: From differentiation to molecular genetics / Grand rounds (Shields Warren Lecturer) Department of Pathology, Beth Israel Deaconess Medical Center
2016	The evolution of immunohistochemistry for soft tissue tumors / Grand rounds Department of Pathology, Massachusetts General Hospital
2017	Pathology of colorectal polyps and cancer: An update / Invited lecture Division of Gastroenterology, Brigham and Women's Hospital
2017	21 <sup>st</sup> century immunohistochemistry for soft tissue tumors / Invited lecture Department of Pathology, Children's Hospital Boston
2017	Carcinoma of unknown primary: immunohistochemistry using lineage-restricted transcription factors / Invited lecture Gastrointestinal Cancer Center, Dana Farber Cancer Institute
2018	Gastrointestinal pathology: A luminal potpourri / Invited lecture Division of Gastroenterology, Brigham and Women's Hospital

# Report of Regional, National and International Invited Lectures and Presentations

# **Regional Invited Presentations and Courses**

2004	Myoepithelioma of soft tissue / Case presentation New England Society of Pathologists, Boston
2006	Annual Cancer Symposium: Advances in Approaches to the Treatment of Sarcomas: Pathology of sarcomas / Invited lecture Berkshire Medical Center, Pittsfield, MA
2006	Pathology of Barrett's esophagus / Invited lecture Boston Surgical Society, Boston
2008	Soft tissue tumor pathology: New insights and novel markers / Grand rounds Rhode Island Hospital, Providence, RI
2011	Recent advances in soft tissue tumor pathology / Grand rounds Boston University Medical Center, Boston, MA

2011	Bridge Project Symposium: Pathology of pancreatic cancer / Invited lecture Koch Institute, Massachusetts Institute of Technology
2013	Advances in soft tissue tumor pathology: Immunohistochemistry and molecular genetics / Grand rounds University of Massachusetts, Worcester, MA
2014	A practical approach to the diagnosis of cutaneous spindle cell tumors / Invited lecture Massachusetts Academy of Dermatology, Newport, RI
2015	Soft tissue tumor pathology: Recent advances in molecular genetics / Invited lecture Hartford Hospital, Hartford, CT
2016	Innovations in Pathology Lecture: The evolution of diagnostic immunohistochemistry for soft tissue tumors / Invited lecture New England Society of Pathologists, Boston, MA
2017	Soft tissue tumors: A contemporary update / Invited lecture Massachusetts Society of Pathologists, Waltham, MA

2018 (scheduled) What's new in soft tissue tumor pathology? / Grand rounds University of Massachusetts, Worcester, MA

# **National Invited Presentations and Courses**

2005	Tumors of the pancreas / Invited lecture American Association of Pathologists' Assistants, Boston, MA
2006	Bone & Soft Tissue Pathology Specialty Conference: Myoepithelial carcinoma of soft tissue / Invited lecture United States and Canadian Academy of Pathology Annual Meeting, Atlanta, GA
2008	Advances in soft tissue pathology: Recently described entities and improved diagnostic tools / Invited lecture Cellnetix, Seattle, WA
2009	Surgical Pathology Specialty Conference: PEComa / Invited lecture United States and Canadian Academy of Pathology Annual Meeting, Boston, MA
2009	Fibrohistiocytic lesions of children: An update; superficial nerve sheath tumors and mimics / Invited lectures American Society of Dermatopathology, Chicago, IL
2010	International Society of Bone and Soft Tissue Pathology Companion Meeting: The prognostic role of immunohistochemistry in sarcomas / Invited lecture United States and Canadian Academy of Pathology Annual Meeting, Washington, DC

2010	Immunohistochemistry in soft tissue tumor pathology; mesenchymal tumors of the gastrointestinal tract / Invited lectures Oklahoma State Association of Pathology, Oklahoma City, OK
2010	The molecular continuum of Barrett's esophagus to esophagogastric cancer / Invited lecture American Society of Clinical Oncology, Chicago, IL
2010	Update on soft tissue tumor pathology: New molecular insights and novel diagnostic markers / 25th Rosilie O. Saffos Memorial Lecture University of Florida, Jacksonville, FL
2010-2012	Non-melanocytic mimics of melanoma: Problems in differential diagnosis / Short course United States and Canadian Academy of Pathology Annual Meeting
2010	Contemporary Topics in Surgical Pathology XXIV: Soft Tissue Pathology: Immunohistochemistry in soft tissue pathology; an update on cutaneous mesenchymal tumors; an update on nerve sheath tumors; an update on gastrointestinal mesenchymal tumors / Invited lectures St. Thomas Hospital, Nashville, TN
2010	Recent advances in soft tissue tumors; diagnostic problems in surgical pathology / Invited lectures California Society of Pathologists, San Francisco, CA
2011	Recent advances in soft tissue tumor pathology / Invited lectures Arizona Society of Pathologists, Mesa, AZ
2011	Cutaneous mastocytosis and systemic mastocytosis: Diagnostic features and pathologic markers / Invited lecture The Mastocytosis Society Conference, Boston, MA
2012-2014	Classification and prognostication of mesenchymal tumors of the gastrointestinal tract Short Course United States and Canadian Academy of Pathology Annual Meeting
2012	Soft tissue tumor pathology: An update / Invited lectures Florida Society of Pathology, West Palm Beach, FL
2012	Practical Pathology Seminars: Non-melanocytic mimics of melanoma: Problems in differential diagnosis / Short Course United States and Canadian Academy of Pathology, Boston, MA

2012	Foundations in Cancer Medicine Symposium: Order and Disorder in Development and Malignancy: Succinate dehydrogenase deficiency and human neoplasia / Invited lecture Fox Chase Cancer Center, Philadelphia, PA
2012	Immunohistochemistry in soft tissue tumor pathology: Recent developments based on genetic alterations; gastrointestinal stromal tumors: from KIT to succinate dehydrogenase / Invited lectures Seattle Area Quarterly Pathology Seminars, Phenopath, Seattle, WA
2012	Skin and gastrointestinal tract pathology / Invited lecture Mastocytosis symposium and consensus meeting on classification and diagnostic criteria for mastocytosis, Boston, MA
2013	Update on soft tissue tumor pathology; Tumors of the pancreas: Immunohistochemistry in differential diagnosis; Practical approach to the diagnosis of cutaneous soft tissue tumors / Invited lectures Applied Immunohistochemistry and Molecular Pathology Course, Miami, FL
2013	Gastrointestinal stromal tumors: From KIT to succinate dehydrogenase / Grand rounds University of Pittsburgh, Pittsburgh, PA
2013	Gastrointestinal stromal tumors: An update / Grand rounds Yale University, New Haven, CT
2013	Long course: Soft tissue pathology: Novel uses of immunohistochemistry in the diagnosis and classification of soft tissue tumors / Invited lecture United States and Canadian Academy of Pathology Annual Meeting, Baltimore, MD
2013	Bone & Soft Tissue Pathology Specialty Conference: Succinate dehydrogenase-deficient gastrointestinal stromal tumors / Invited lecture United States and Canadian Academy of Pathology Annual Meeting, Baltimore, MD
2013	Cutaneous soft tissue tumors / Invited lectures Dermpedia, Scottsdale, AZ
2013	New developments in soft tissue tumor pathology / Grand rounds University of Iowa, Iowa City
2013	Surgical Pathology Update: Immunohistochemistry / Invited lecture American Society of Clinical Pathology, Montreal, Canada
2013	Diagnostic Update: Soft tissue pathology and immunohistochemistry / Invited lectures United States and Canadian Academy of Pathology, Anchorage, AK
2013	Surgical pathology update course: Soft tissue tumors / Invited lectures Ohio State University, Columbus, OH

2013	Gastrointestinal stromal tumors: From KIT to succinate dehydrogenase / Grand rounds Vanderbilt University Medical Center, Nashville, TN
2014	Mesenchymal tumors of the gastrointestinal tract: An update / Invited lecture New York Pathological Society, New York, NY
2014	Succinate dehydrogenase-deficient tumors: An update / Grand rounds Cleveland Clinic, Cleveland, OH
2014	Gastrointestinal Pathology Society Companion Meeting: Metastatic carcinoma of unknown primary: Diagnostic Approach Using Immunohistochemistry / Invited lecture United States and Canadian Academy of Pathology Annual Meeting, San Diego, CA
2014	Practical Pathology Seminars: Classification and prognostication of mesenchymal tumors of the gastrointestinal tract / Short Course United States and Canadian Academy of Pathology, New York, NY
2014	Surgical Pathology Update: Immunohistochemistry / Invited lecture American Society of Clinical Pathology, Chicago, IL
2014	Succinate dehydrogenase-deficient tumors: Pathologic features, pathogenesis, and clinical implications / Research seminar series University of Virginia, Charlottesville, VA
2014	Soft tissue tumor pathology: An update on classification and molecular genetics including "next generation" immunohistochemistry / Grand rounds Case Western Reserve University, Cleveland, OH
2015	Interactive microscopy: Histologic variants of GIST and histologic mimics you don't want to miss! / Invited lecture United States and Canadian Academy of Pathology Annual Meeting, Boston, MA
2015-2017	A Pattern-Based Approach to the Diagnosis of Soft Tissue Tumors / Short Course United States and Canadian Academy of Pathology Annual Meeting
2015	A practical approach to surgical pathology: Immunohistochemistry / Invited lectures Educational Symposia, Las Vegas, NV
2015	"Next generation" immunohistochemistry in soft tissue tumor pathology / Grand rounds UCLA, Los Angeles, CA
2015	Immunohistochemistry: Basics and Clinical Applications / Invited lectures American Society of Clinical Pathology, Redondo Beach, CA

2015	Surgical pathology course: Soft tissue tumors / Invited lectures Scientific Symposiums, Williamsburg, VA
2015	"Next generation" immunohistochemistry in the diagnosis of soft tissue tumors / Grand rounds Stanford University, Stanford, CA
2015	Surgical pathology course: Gastrointestinal pathology / Invited lectures Scientific Symposiums, Hawaii
2015	Immunohistochemistry: Novel markers for soft tissue tumors / Grand Rounds Geisinger Medical Center, Danville, PA
2016	Metastatic carcinoma of unknown origin: Diagnostic approach / Invited lecture Texas Society of Pathologists, Dallas, TX
2016	Immunohistochemistry for soft tissue tumors: What's new? / Invited lecture North Texas Society of Pathology, Dallas, TX
2016	An approach to the diagnosis of epithelioid and pleomorphic soft tissue tumors / Grand rounds UT Southwestern, Dallas, TX
2016	Gastrointestinal pathology and soft tissue tumor pathology / Invited lectures Washington State Society of Pathologists Annual Meeting, Seattle, WA
2016	International Society of Bone and Soft Tissue Pathology Companion Meeting: <i>ALK</i> fusion-positive mesenchymal tumors / Invited lecture United States and Canadian Academy of Pathology Annual Meeting, Seattle, WA
2016	Soft tissue tumor pathology and immunohistochemistry / Invited lectures 23rd Annual Seminar in Pathology, Pittsburgh, PA
2016	Immunohistochemistry: Basics and clinical applications / Invited lectures American Society of Clinical Pathology, Chicago, IL
2016	Soft tissue tumors of the head and neck / Invited lecture American Academy of Oral & Maxillofacial Pathology, Cincinnati, OH
2016	The evolution of immunohistochemistry for soft tissue tumors: From differentiation to molecular genetics / Keynote speaker (A. James French Lecturer) University of Michigan, Ann Arbor, MI
2016	Soft tissue tumor pathology: An anatomic and pattern-based approach / Interactive microscopy course United States and Canadian Academy of Pathology, Palm Springs, CA

2017	The evolution of immunohistochemistry for soft tissue tumors: From differentiation to molecular genetics / Grand rounds University of Florida, Gainsville, FL
2017	Surgical pathology course: Soft tissue tumor pathology / Invited lectures Scientific Symposiums, Hawaii
2017	Hot Topics: Immunohistochemistry in the evaluation of tumors of undetermined origin / Invited panel discussion United States and Canadian Academy of Pathology Annual Meeting, San Antonio, TX
2017	Society of Hematopathology Companion Meeting: Classification, immunohistochemistry, and molecular genetics of dendritic cell neoplasms / Invited lecture United States and Canadian Academy of Pathology Annual Meeting, San Antonio, TX
2017	The evolution of immunohistochemistry for soft tissue tumors: From differentiation to molecular genetics / Grand rounds Memorial Sloan-Kettering Cancer Center, New York, NY
2017	Cutaneous soft tissue tumors / Invited lectures Dermpedia, San Diego, CA
2017	Diagnostic immunohistochemistry: Novel markers for soft tissue tumors; approach to carcinoma of unknown primary / Keynote speaker North Carolina Society of Pathologists, Wrightsville Beach, NC
2017	A practical review of soft tissue tumor and gastrointestinal pathology / Invited lectures Educational Symposia, Alaska
2017	Surgical pathology update: Diagnostic pearls for the practicing pathologist: Immunohistochemistry / Invited lectures Educational Symposia, Las Vegas, NV
2017	What's new in soft tissue tumor pathology? / Invited lecture Madigan Army Medical Center, Tacoma, WA
2017	Diagnostic challenges in soft tissue tumor pathology / Invited lecture Oregon Pathologists Association, Portland, OR
2017	Next generation immunohistochemistry for the diagnosis of soft tissue tumors / Grand rounds Emory University, Atlanta, GA

2017	Soft tissue tumor pathology: Novel diagnostic markers based on recent molecular insights; Diagnostic problems in surgical pathology / Invited lectures California Society of Pathology, San Francisco, CA		
2017	Diagnostic challenges in soft tissue and bone pathology: epithelioid tumors and round cell sarcomas / Interactive microscopy course United States and Canadian Academy of Pathology, Palm Springs, CA		
2018	High intensity interval training in GI pathology: GI lymphomas and other hematopoietic tumors: What do we need to know? GI mesenchymal tumors: from GIST to GNET / Interactive microscopy course United States and Canadian Academy of Pathology, Palm Springs, CA		
2018	The evolution of immunohistochemistry for soft tissue tumors in the 21st century: From differentiation to molecular genetics; Beyond lineage: Diagnostic and predictive molecular immunohistochemistry for surgical pathologists / Invited lectures Applied Immunohistochemistry and Molecular Pathology Course, Key Largo, FL		
2018	Rodger Haggitt Gastrointestinal Pathology Society: Beyond GIST: Recent advances in gastrointestinal mesenchymal tumors / Invited lecture United States and Canadian Academy of Pathology Annual Meeting, Vancouver		
2018	Long course: The Limited Sample: Doing More with Less: Limited biopsies of soft tissue tumors: The contemporary role of immunohistochemistry and molecular diagnostics / Invited lecture United States and Canadian Academy of Pathology Annual Meeting, Vancouver		
2018 (schedul	ed) From KIT to succinate dehydrogenase: The GIST of it; Subclassification of pleomorphic sarcomas: How and why should we care? / Invited lectures American Registry of Pathology Course, Johns Hopkins, Baltimore, MD		
2018 (schedul	ed) The evolution of immunohistochemistry for soft tissue tumors: From differentiation to molecular genetics / Grand rounds University of Minnesota, Minneapolis, MN		
2018 (schedul	ed) Next generation immunohistochemistry for the diagnosis of soft tissue tumors / Grand rounds University of Alabama, Birmingham, AL		
2018 (schedul	ed) Modern surgical pathology through the expert eyes of APSS-USCAP: Soft tissue tumors of the extremities and trunk; Soft tissue tumors of the abdominal cavity, retroperitoneum, and visceral organs / Interactive microscopy course United States and Canadian Academy of Pathology, Palm Springs, CA		

2018 (scheduled) Recent advances in soft tissue pathology: Evolving classification, novel molecular findings, and new diagnostic markers / Interactive microscopy course United States and Canadian Academy of Pathology, Palm Springs, CA

- 2019-2021 (scheduled) Immunohistochemistry in Oncopathology: Indispensable Complement to a Morphology-Driven Pattern-Based Approach / Short Course United States and Canadian Academy of Pathology Annual Meeting
- 2019 (scheduled) Current Issues in Anatomic Pathology: Soft tissue pathology / Invited lectures UCSF, San Francisco, CA
- 2019 (scheduled): Geisinger Seminar in Anatomic Pathology: 21<sup>st</sup> century immunohistochemistry for soft tissue tumors / Invited lecture

  Danville, PA

### **International Invited Presentations and Courses**

2008	Intermediate grade malignancy in adipocytic tumors; gastrointestinal stromal tumors: mutational testing and tyrosine kinase inhibitor therapy / Invited lectures Intercontinental Congress of Pathology, Barcelona, Spain
2008	An Integrated Approach to Soft Tissue Tumor Diagnosis: Inflammatory myofibroblastic tumors and related lesions; Benign Neoplasms and Pseudoneoplasms of Soft Tissue: Cellular neurothekeoma / Invited lectures International Congress of the International Academy of Pathology, Athens, Greece
2009	Pathology of the PEComa family of tumors / Invited lecture The LAM Foundation 2009 International Research Conference, Cincinnati, OH
2009	Soft tissue tumors of the gastrointestinal tract; atypical round cell inflammatory myofibroblastic tumors / Invited lectures European Congress of Pathology, Florence, Italy
2009	Update on soft tissue tumor pathology: From morphology to molecular genetics and back again / Keynote address Irish Society of Surgical Pathology, Cork, Ireland
2010	1st Edinburgh Dermatopathology Tutorial: Practical approach to the diagnosis of cutaneous soft tissue tumors / Invited lectures The University of Edinburgh, Edinburgh, U.K.
2010	Pathology course: Gastrointestinal stromal tumor of the esophagus; Plenary Session: Surveillance: Reversal of Barrett's Esophagus: Is a clear distinction between prevalent and incident dysplasia mandatory to avoid bias in the study of surveillance cohorts? Plenary Session: Natural History of Barrett's Esophagus: May photodynamic therapy alter the natural history of dysplasia in Barrett's esophagus? / Invited lectures OESO World Conference on Diseases of the Esophagus, Boston

2010	Gastrointestinal stromal tumors - where do we stand with diagnosis, prognosis and genotyping? / Invited lecture International Congress of the International Academy of Pathology, Sao Paulo, Brazil
2011	Update on immunohistochemistry in soft tissue pathology; update on gastrointestinal stromal tumors / Invited lectures Maastricht, The Netherlands
2011	Novelties in dermatopathology: What's new in soft tissue tumors? Soft tissue tumors at the border: Follicular dendritic cell sarcoma / Invited lectures European Congress of Pathology, Helsinki, Finland
2012	Histopathological and immunohistochemical diagnosis of spindle cell sarcomas: Clues and pitfalls; atypical fibroxanthoma and its mimics; cutaneous mesenchymal and adnexal tumour pathology / Invited lectures European Congress of Pathology, Prague, Czech Republic
2012	Vascular tumors of soft tissue: Diagnostic problems; update on immunohistochemistry in soft tissue tumors; Gynecologic pathology: Uterine PEComa; Bone and soft tissue pathology: Clear cell sarcoma-like tumor of the GI tract / Invited lectures International Congress of the International Academy of Pathology, Cape Town
2013	Diagnostic Histopathology of Soft Tissue Tumors: Novel uses of immunohistochemistry in the diagnosis and classification of soft tissue tumors; Mesenchymal tumors of the GI tract: an update / Invited lectures Treviso, Italy
2013	2nd Edinburgh Hematopathology Tutorial: Histiocytic and dendritic cell tumors / Invited lectures The University of Edinburgh, Edinburgh, U.K.
2013	Soft tissue tumor pathology: Low grade fibromyxoid sarcoma; targeted therapies in sarcomas: What pathologists need to know and report; Soft tissue tumor pathology: How I diagnose cellular fibrous histiocytoma vs atypical fibrous histiocytoma vs atypical fibroxanthoma vs pleomorphic dermal sarcoma; Surgical pathology: How I diagnose deep soft tissue spindle cell neoplasms / Invited lectures XXIX Brazilian Congress of Pathology, Florianopolis, Brazil
2013	An update on soft tissue tumor pathology / Invited lectures Tan Tock Seng Hospital, Singapore
2014	21 <sup>st</sup> Update in Dermatopathology: What's new in cutaneous soft tissue tumours? / Invited lecture London, U.K.

2014	Spindle cell tumors of deep soft tissue: Differential diagnosis and novel markers; Gastrointestinal stromal tumors: An update / Invited lectures Western University, London, Ontario, Canada
2014	Molecular pathology of skin malignancies: Cutaneous mesenchymal tumors; Challenges in immunohistochemistry and genetics of soft tissue tumors; Important diagnoses in dermatopathology / Invited lectures European Congress of Pathology, London, U.K.
2014	An update on soft tissue tumor pathology / Invited lectures Perth, Australia
2015	Diagnostic surgical pathology course: Gastrointestinal and soft tissue tumor pathology / Invited lectures South Africa
2015	Diagnostic histopathology of soft tissue tumors: Challenges in immunohistochemistry and genetics of soft tissue tumors; Differential diagnosis of epithelioid soft tissue tumors / Invited lectures Treviso, Italy
2015	Practical challenges in sarcoma diagnostics: Epithelioid soft tissue tumors; Update on cutaneous mesenchymal tumors: Pseudomyogenic hemangioendothelioma Invited lectures European Congress of Pathology, Belgrade, Serbia
2015	An update on applications of immunohistochemistry in diagnostic surgical pathology / Invited lectures Timisoara, Romania
2015	An update on gastrointestinal pathology / Invited lectures Nagaoka, Japan
2016	A tour around bone and soft tissue tumors / Invited lectures Barcelona, Spain
2016	William Anderson Day lecture: The evolution of immunohistochemistry for soft tissue tumors: From differentiation to molecular genetics / Invited lecture University of Toronto, Toronto, Canada
2016	Rodger Haggitt Gastrointestinal Pathology Society: Mesenchymal lesions of the gastrointestinal tract / Invited lecture Joint International Congress of the International Academy of Pathology and European Congress of Pathology, Cologne, Germany

2016	Evolving classification of soft tissue tumors / Keynote speaker 6 <sup>th</sup> National Annual Conference on Soft Tissue and Bone Tumor Pathology, Shanghai, China		
2017	The evolution of immunohistochemistry for soft tissue tumors: From differentiation to molecular genetics; Metastatic carcinoma of unknown primary: approach to diagnosis using lineage-restricted transcription factor immunohistochemistry (thank you, developmental biology) / Keynote speaker Australasian Division of the International Academy of Pathology, Sydney, Australia		
2017	The evolution of immunohistochemistry for soft tissue tumors: From differentiation to molecular genetics / Invited lecture 50th Annual Musculoskeletal Tumor Meeting of the Japanese Orthopaedic Association, Tokyo, Japan		
2017	Kyushu-Okinawa Conference: Mesenchymal tumors of the gastrointestinal tract: An Update / Invited lecture Fukuoka, Japan		
2017	Spindle cell tumors of deep soft tissue: Key features and differential diagnosis / Invited Lecture Kyoto, Japan		
2017	Diagnostic histopathology of soft tissue tumors / Invited lectures Treviso, Italy		
2018	Current Topics from the Next Generation of AFIP/ARP Fascicles: Spindle cell tumors of the upper gastrointestinal tract: the GIST of it and more / Invited lecture Morphologietage Bamberg, Bamberg, Germany		
2018 (schedule	ed) An update on soft tissue tumor pathology, gastrointestinal pathology, and diagnostic immunohistochemistry / Invited lectures Educational Symposia, Mediterranean and Aegean		
2018 (schedule	ed) Diagnostic Pathology Update: Spindle cell tumors of deep soft tissue: What do we need to know? An approach to epithelioid soft tissue tumors: It's getting easier! Mesenchymal tumors of the GI tract; Subclassification of pleomorphic sarcomas: How and why should we care? / Invited lectures United States and Canadian Academy of Pathology, Florence, Italy		
2018 (schedul	ed) Cutaneous soft tissue tumor pathology / Invited lectures Copenhagen, Denmark		
2019 (schedul	ed) Recent Advances in Oncologic Pathology: Mesenchymal tumors of the gastrointestinal tract / Invited lectures Padua, Italy		

2019 (scheduled) 10<sup>th</sup> Edinburgh Dermatopathology Tutorial: Approach to cutaneous soft tissue tumors / Invited lectures

The University of Edinburgh Edinburgh LLK

The University of Edinburgh, Edinburgh, U.K.

2019 (scheduled) Bone and soft tissue tumor pathology symposium / Invited lectures St. Petersburg, Russia

2020 (scheduled) From the soft tissue through the bone to the bone marrow / Invited lectures Warsaw, Poland

### **Report of Clinical Activities and Innovations**

#### **Current Licensure and Certification**

2001-	Commonwealth of Massachusetts Full Medical License
2002	American Board of Pathology (Anatomic Pathology)

#### **Practice Activities**

Surgical Pathology	Hospital practice	Pathology, BWH	12 weeks per year
Soft Tissue Tumor Pathology (Institutional consults)			
	Hospital practice	Pathology, BWH	10 weeks per year
Gastrointestinal Pathology	Hospital practice	Pathology, BWH	8 weeks per year
Endocrine Pathology	Hospital practice	Pathology, BWH	8 weeks per year
Fluorescence in situ hybridiz	ation (HER2 FISH)	Pathology, BWH	10 weeks per year

#### **Clinical Innovations**

In order to provide objective and more widely available methods for the diagnosis of soft tissue tumors, I have been the first or among the first to develop protein-based diagnostic biomarkers that correlate with molecular genetic alterations, which can be evaluated by immunohistochemistry. Many of these markers have dramatically changed clinical practice and have become standard of care internationally for confirming the diagnosis of a wide range of tumor types. Examples include:

- INI1 (SMARCB1) for epithelioid sarcoma and epithelioid malignant peripheral nerve sheath tumor
- MUC4 for low-grade fibromyxoid sarcoma and sclerosing epithelioid fibrosarcoma
- RB1 (retinoblastoma) for spindle cell/pleomorphic lipoma, mammary-type myofibroblastoma, and cellular angiofibroma
- SDHA for gastrointestinal stromal tumors with SDHA mutations
- SATB2 for osteosarcoma
- STAT6 for solitary fibrous tumor
- ROS1 for inflammatory myofibroblastic tumors with ROS1 rearrangements
- ALK for epithelioid fibrous histiocytoma
- CAMTA1 for epithelioid hemangioendothelioma
- Histone H3 with lysine 27 trimethylation for malignant peripheral nerve sheath tumor

- ETV4 for sarcomas with *CIC* rearrangements
- FOSB for pseudomyogenic hemangioendothelioma

I have been instrumental in helping to define diagnostic criteria for and clinical behavior of poorly characterized and previously unrecognized soft tissue tumor types. These tumor types are now recognized globally and have been incorporated into the World Health Organization classification. These include myoepithelial tumors of soft tissue, histologically and immunophenotypically distinctive neoplasms that range from benign myoepitheliomas and mixed tumors to malignant myoepithelial carcinomas; intestinal perineurioma, an intramucosal proliferation of perineurial cells often associated with colorectal serrated polyps; sclerosing perivascular epithelioid cell tumor (PEComa), a distinctive variant of PEComa with a predilection for the pararenal retroperitoneum; hybrid schwannoma/perineurioma, a distinctive benign nerve sheath tumor unassociated with neurofibromatosis; pseudomyogenic hemangioendothelioma, a distinctive, rarely metastasizing vascular neoplasm that often presents as multifocal disease in different tissue planes of the limbs of young men; epithelioid inflammatory myofibroblastic sarcoma, an aggressive, usually intraabdominal variant of inflammatory myofibroblastic tumor with distinctive histology, a unique pattern of ALK expression, and a characteristic gene fusion; and "pediatric-type" (now widely known as succinate dehydrogenase-deficient) gastrointestinal stromal tumors (GIST), a histologically distinctive subset of GIST that arise in the stomach, often metastasize to lymph nodes, and show dysregulation of the succinate dehydrogenase complex.

# **Report of Education of Patients and Service to the Community**

### **Patient Educational Material**

1. **Hornick JL**, Lazar AJF. Gastrointestinal Stromal Tumor: Understanding your GIST Pathology Report [educational booklet and online resource]. GIST Support International, 2010.

# **Report of Scholarship**

### Peer Reviewed Publications in print or other media

### **Research Investigations**

- 1. Akileswaran L, Alic M, Clark EK, **Hornick JL**, Gold M. Isolation and transformation of uracil auxotrophs of the lignin-degrading basidiomycete Phanerochaete chrysosporium. Curr Genet 1993;23:351-356.
- 2. Hu P, Glasky MS, Yun A, Alauddin MM, **Hornick JL**, Khawli LA, Epstein AL. A human-mouse chimeric Lym-1 monoclonal antibody with specificity for human lymphomas expressed in a baculovirus system. Hum Antibod Hybrid 1995;6:57-67.
- 3. Epstein AL, Khawli LA, **Hornick JL**, Taylor CR. Identification of a monoclonal antibody, TV-1, directed against the basement membrane of tumor vessels, and its use to enhance the delivery of macromolecules to tumors after conjugation with interleukin 2. Cancer Res 1995;55:2673-2680.

- 4. Khawli LA, Milkie MN, **Hornick JL**, Glasky MS, Sharifi J, Hu,P, Epstein AL. Production of immunoreactive F(ab')<sub>2</sub> fragments in high yield from murine IgG<sub>1</sub> monoclonal antibodies. Int J Biochromat 1996;2:89-99.
- 5. Hu P, **Hornick JL**, Glasky MS, Yun A, Milkie MN, Khawli LA, Anderson PM, Epstein AL. A chimeric Lym-1/interleukin 2 fusion protein for increasing tumor vascular permeability and enhancing antibody uptake. Cancer Res 1996;56:4998-5004.
- 6. Khawli LA, **Hornick JL**, Sharifi J, Epstein AL. Improving the chemotherapeutic index of IUdR using a vasoactive immunoconjugate. Radiochim Acta 1997;79:83-86.
- 7. **Hornick JL**, Khawli LA, Hu P, Lynch M, Anderson PM, Epstein AL. Chimeric CLL-1 antibody fusion proteins containing granulocyte-macrophage colony-stimulating factor or interleukin 2 with specificity for B-cell malignancies exhibit enhanced effector functions while retaining tumor targeting properties. Blood 1997;89:4437-4447.
- 8. Funakoshi S, Hirano A, Beckwith M, Asai O, Jorgensen G, Tian Z-g, **Hornick JL**, Hu P, Khawli LA, Epstein AL, Longo DL, Murphy WJ. Antitumor effects of nonconjugated murine Lym-2 and human-mouse chimeric CLL-1 monoclonal antibodies against various human lymphoma cell lines *in vitro* and *in vivo*. Blood 1997;90:3160-3166.
- 9. **Hornick JL**, Sharifi J, Hu P, Khawli LA, Biela BH, Mizokami MM, Yun A, Taylor CR, Epstein AL. A new chemically modified chimeric TNT-3 monoclonal antibody directed against DNA for the radioimmunotherapy of solid tumors. Cancer Biother Radiopharm 1998;13:255-268.
- 10. **Hornick JL**, Khawli LA, Hu P, Sharifi J, Khanna C, Epstein AL. Pretreatment with a monoclonal antibody/interleukin 2 fusion protein directed against DNA enhances the uptake of therapeutic molecules to solid tumors. Clin Cancer Res 1999;5:51-60.
- 11. **Hornick JL**, Sharifi J, Khawli LA, Hu P, Bai WG, Alauddin MM, Mizokami MM, Epstein AL. Single amino acid substitution in the Fc region of chimeric TNT-3 antibody accelerates clearance and improves immunoscintigraphy of solid tumors. J Nucl Med 2000;41:355-362.
- 12. Nascimento AF, Ruiz R, **Hornick JL**, Fletcher CDM. Calcifying fibrous 'pseudotumor': clinicopathologic study of 15 cases and analysis of its relationship to inflammatory myofibroblastic tumor. Int J Surg Pathol 2002;10:189-196.
- 13. **Hornick JL,** Fletcher CDM. Immunohistochemical staining for KIT (CD117) in soft tissue sarcomas is very limited in distribution. Am J Clin Pathol 2002;117:188-193; **with editorial**.
- 14. Johnson BE, Fischer T, Fischer B, Dunlop D, Rischin D, Silberman S, Kowalski MO, Sayles D, Dimitrijevic S, Fletcher C, **Hornick J**, Salgia R, Le Chevalier T. Phase II study of imatinib in patients with small cell lung cancer. Clin Cancer Res 2003;9:5880-5887.
- 15. **Hornick JL**, Fletcher CDM. Myoepithelial tumors of soft tissue: A clinicopathologic and immunohistochemical study of 101 cases with evaluation of prognostic parameters. Am J Surg Pathol 2003;27:1183-1196.

- 16. **Hornick JL**, Fletcher CDM. Cutaneous myoepithelioma: A clinicopathologic and immunohistochemical study of 14 cases. Hum Pathol 2004;35:14-24.
- 17. Mutinga ML, Odze, RD, Wang HH, **Hornick JL**, Farraye FA. The clinical significance of right-sided colonic inflammation in patients with left-sided chronic ulcerative colitis. Inflam Bowel Dis 2004;10:215-219.
- 18. Medeiros F, Corless CL, Duensing A, **Hornick JL**, Oliveira AM, Heinrich MC, Fletcher JA, Fletcher CDM. Kit-negative gastrointestinal stromal tumors: Proof of concept and therapeutic implications. Am J Surg Pathol 2004;28:889-894.
- 19. Odze RD, Farraye FA, Hecht JL, **Hornick JL**. Long-term follow-up after polypectomy treatment for adenoma-like dysplastic lesions in ulcerative colitis. Clin Gastro Hepatol 2004;2:534-541; **with editorial**.
- 20. Duensing A, Joseph NE, Medeiros F, Smith F, **Hornick JL**, Heinrich MC, Corless CL, Demetri GD, Fletcher CDM, Fletcher JA. Protein kinase C  $\theta$  (PKC $\theta$ ) expression and constitutive activation in gastrointestinal stromal tumors (GISTs). Cancer Res 2004;64:5127-5131.
- 21. **Hornick JL**, Jaffe ES, Fletcher CDM. Extranodal histiocytic sarcoma: Clinicopathologic analysis of 14 cases of a rare epithelioid malignancy. Am J Surg Pathol 2004;28:1133-1144.
- 22. **Hornick JL**, Bosenberg MW, Mentzel T, McMenamin ME, Oliveira AM, Fletcher CDM. Pleomorphic liposarcoma: Clinicopathologic analysis of 57 cases. Am J Surg Pathol 2004;28:1257-1267.
- 23. **Hornick JL**, Blount PL, Sanchez CA, Cowan DS, Ayub K, Maley CC, Reid BJ, Odze RD. Biologic properties of columnar epithelium underneath reepithelialized squamous mucosa in Barrett's esophagus. Am J Surg Pathol 2005;29:372-380.
- 24. **Hornick JL**, Lauwers GY, Odze RD. Immunohistochemistry can help distinguish metastatic pancreatic adenocarcinomas from bile duct adenomas and hamartomas of the liver. Am J Surg Pathol 2005;29:381-389.
- 25. **Hornick JL,** Fletcher CDM. Intraabdominal cystic lymphangiomas obscured by marked superimposed reactive changes: Clinicopathological analysis of a series. Hum Pathol 2005;36:426-432.
- 26. **Hornick JL**, Fletcher CDM. Soft tissue perineurioma: Clinicopathologic analysis of 81 cases including those with atypical histologic features. Am J Surg Pathol 2005;29:845-858.
- 27. **Hornick JL**, Fletcher CDM. Intestinal perineuriomas: clinicopathologic definition of a new anatomic subset in a series of 10 cases. Am J Surg Pathol 2005;29:859-865.

- 28. **Hornick JL**, Farraye FA, Odze RD. Prevalence and significance of prominent mucin pools in the esophagus post neoadjuvant chemoradiotherapy for Barrett's-associated adenocarcinoma. Am J Surg Pathol 2006;30:28-35.
- 29. Hahn HP, Bundock EA, **Hornick JL**. Immunohistochemical staining for claudin-1 can help distinguish meningiomas from histologic mimics. Am J Clin Pathol 2006;125:203-208.
- 30. **Hornick JL,** Fletcher CDM. Intra-articular nodular fasciitis a rare lesion: Clinicopathologic analysis of a series. Am J Surg Pathol 2006;30:237-241.
- 31. Carter MR, **Hornick JL**, Lester S, Fletcher CDM. Spindle cell (sarcomatoid) carcinoma of the breast: A clinicopathologic and immunohistochemical analysis of 29 cases. Am J Surg Pathol 2006;30:300-309.
- 32. Carrasco DR, Fenton T, Protopopova M, Sukhdeo K, German M, You M, Divicio D, Nogueira C, Stommel J, Fletcher CD, **Hornick JL**, Cavenie W, Funary F, DePinho RA. The PTEN and INK4a/ARF tumor suppressors maintain myelolymphoid homeostasis and cooperate to constrain histiocytic sarcoma development in humans. Cancer Cell 2006;9:379-390.
- 33. Reis-Filho JS, Pinheiro C, Lambros MBK, Milanezi F, Carvalho S, Savage K, Simpson PT, Jones C, Swift S, Mackay A, Reis RM, **Hornick JL**, Pereira EM, Baltazar F, Fletcher CDM, Ashworth A, Lakhani SR, Schmitt FC. EGFR amplification and lack of activating mutations in metaplastic breast carcinomas. J Pathol 2006;209:445-453.
- 34. Santagata S, **Hornick JL**, Ligon KL. Comparative analysis of germ cell transcription factors in CNS germinoma reveals diagnostic utility of NANOG. Am J Surg Pathol 2006;30:1613-1618.
- 35. Savage K, Lambros MBK, Robertson D, Jones RL, Jones C, Mackay A, James M, **Hornick JL**, Pereira EM, Milanezi F, Fletcher CDM, Schmitt FC, Ashworth A, Reis-Filho JS. Caveolin 1 is overexpressed and amplified in a subset of basal-like and metaplastic breast carcinomas: A morphological, ultrastructural, immunohistochemical and *in situ* hybridisation analysis. Clin Cancer Res 2007;13:90-101.
- 36. **Hornick JL**, Farraye FA, Odze RD. Clinicopathologic and immunohistochemical study of small apparently "de novo" colorectal adenocarcinomas. Am J Surg Pathol 2007;31:207-215.
- 37. Coffin CM, **Hornick JL**, Zhou H, Fletcher CDM. Gardner fibroma: A clinicopathologic and immunohistochemical analysis of 45 patients with 57 fibromas. Am J Surg Pathol 2007;31:410-416.
- 38. **Hornick JL**, Fletcher CDM. Cellular neurothekeoma: Detailed characterization in a series of 133 cases. Am J Surg Pathol 2007;31:329-340.
- 39. Srivastava A, **Hornick JL**, Li X, Blount PL, Sanchez CA, Cowan DS, Ayub K, Maley CC, Reid BJ, Odze RD. Extent of low-grade dysplasia is a risk factor for the development of esophageal adenocarcinoma in Barrett's esophagus. Am J Gastroenterol 2007;102:483-493; **with editorial**.

- 40. Coffin CM, **Hornick JL**, Fletcher CDM. Inflammatory myofibroblastic tumor: Comparison of clinicopathologic, histologic, and immunohistochemical features and ALK expression in atypical and aggressive cases. Am J Surg Pathol 2007;31:509-520.
- 41. Sholl LM, **Hornick JL**, Pinkus JL, Pinkus GS, Padera RF. Immunohistochemical analysis of langerin in langerhans cell histiocytosis and pulmonary inflammatory and infectious diseases. Am J Surg Pathol 2007;31:947-952.
- 42. Santagata S, Ligon KL, **Hornick JL**. Embryonic stem cell transcription factor signatures in the diagnosis of primary and metastatic germ cell tumors. Am J Surg Pathol 2007;31:836-845.
- 43. Hahn HP, **Hornick JL**. Immunoreactivity for CD25 in gastrointestinal mucosal mast cells is specific for systemic mastocytosis. Am J Surg Pathol 2007;31:1669-1676.
- 44. Yu H, Pinkus GS, **Hornick JL**. Diffuse membranous immunoreactivity for D2-40 (podoplanin) distinguishes primary and metastatic seminomas from other germ cell tumors and metastatic neoplasms. Am J Clin Pathol 2007;128:767-775.
- 45. Ito H, **Hornick JL**, Bertagnolli MM, George S, Morgan JA, Baldini EH, Wagner AJ, Demetri GD, Raut CP. Leiomyosarcoma of the inferior vena cava: Impact of multidisciplinary management. Ann Surg Oncol 2007;14:3534-3541.
- 46. Yu H, Gibson JA, Pinkus GS, **Hornick JL**. Podoplanin (D2-40) is a novel marker for follicular dendritic cell tumors. Am J Clin Pathol 2007;128:776-782.
- 47. Hollmann TJ, Brenn T, **Hornick JL**. CD25 expression on cutaneous mast cells from adult patients presenting with urticaria pigmentosa is predictive of systemic mastocytosis. Am J Surg Pathol 2008;32:139-145.
- 48. **Hornick JL**, Mino-Kenudson M, Lauwers GY, Liu W, Goyal R, Odze RD. Buried Barrett's epithelium following photodynamic therapy shows reduced crypt proliferation and absence of DNA content abnormalities. Am J Gastroenterol 2008;103:38-47.
- 49. **Hornick JL**, Fletcher CDM. Sclerosing PEComa: Clinicopathologic analysis of a distinctive variant with a predilection for the retroperitoneum. Am J Surg Pathol 2008;32:493-501.
- 50. Liegl B, **Hornick JL**, Fletcher CDM. Primary cutaneous PEComa: Distinctive clear cell lesions of skin. Am J Surg Pathol 2008;32:608-614.
- 51. Cho NL, Redston M, Zauber AG, Carothers AM, **Hornick J**, Wilton A, Sontag S, Nishioka N, Giardiello FM, Saltzman JR, Gostout C, Eagle CJ, Hawk ET, Bertagnolli MM. Aberrant crypt foci in the Adenoma Prevention with Celecoxib trial. Cancer Prev Res 2008;1:21-31; **with editorial**.

- 52. Gasparotto D, Rossi S, Bearzi I, Doglioni C, Marzotto A, **Hornick JL**, Grizzo A, Sartor C, Moldolesi A, Sciot R, Debiec-Rychter M, Dei Tos AP, Maestro R. Multiple primary sporadic gastrointestinal stromal tumors (GIST) in the adult: An underestimated entity. Clin Cancer Res 2008;14: 5715-5721.
- 53. Wang VS, **Hornick JL**, Sepulveda JA, Mauer R, Poneros JM. Low prevalence of submucosal invasive carcinoma at esophagectomy for high-grade dysplasia or intramucosal adenocarcinoma in Barrett's esophagus: A 20-year experience. Gastrointest Endosc 2009;69:777-783; **with editorial**.
- 54. Liegl B, **Hornick JL**, Antonescu CR, Corless CL, Fletcher CDM. Rhabdomyosarcomatous differentiation in gastrointestinal stromal tumors after tyrosine kinase inhibitor therapy: A novel form of tumor progression. Am J Surg Pathol 2009;33:218-226.
- 55. Wang W, **Hornick JL**, Mallipeddi R, Zelger BG, Rother JD, Yang D, Lev DC, Trent JC, Prieto VJ, Brenn T, Calonje E, Lazar AJ. Cutaneous and subcutaneous metastases of gastrointestinal stromal tumors: A series of 5 cases with molecular analysis. Am J Dermatopathol 2009;31:297-300.
- 56. Marsee DK, Pinkus GS, **Hornick JL**. Podoplanin (D2-40) is a highly effective marker of follicular dendritic cells. Appl Immunohistochem Mol Morphol 2009;17:102-107.
- 57. Liegl B, **Hornick JL**, Corless CL, Fletcher CDM. Monoclonal antibody DOG1.1 shows higher sensitivity than KIT in the diagnosis of gastrointestinal stromal tumors, including unusual subtypes. Am J Surg Pathol 2009;33:437-446.
- 58. Kulke MH, **Hornick JL**, Frauenhoffer C, Hooshmand S, Ryan DP, Enzinger PC, Meyerhardt JA, Clark JW, Stuart K, Fuchs CS, Redston MS. O6-methylguanine DNA methyltransferase deficiency and response to temozolomide-based therapy in patients with neuroendocrine tumors. Clin Cancer Res 2009;15:338-345.
- 59. Yang Q, **Hornick JL**, Granter SR, Wang LC. Merkel cell carcinoma: Lack of KIT positivity and implications for the use of imatinib mesylate. Appl Immunohistochem Mol Morphol 2009;17:276-281.
- 60. Chang MC, Vargas SO, **Hornick JL**, Hirsch MS, Crum CP, Nucci MR. Embryonic stem cell transcription factors and D2-40 (podoplanin) as diagnostic immunohistochemical markers in ovarian germ cell tumors. Int J Gynecol Pathol 2009;28:347-355.
- 61. **Hornick JL**, Dal Cin P, Fletcher CDM. Loss of INI1 expression is characteristic of both conventional and proximal-type epithelioid sarcoma. Am J Surg Pathol 2009;33:542-550.
- 62. Srivastava A, **Hornick JL**. Immunohistochemical staining for CDX-2, PDX-1, NESP-55, and TTF-1 can help distinguish gastrointestinal carcinoid tumors from pancreatic endocrine and pulmonary carcinoid tumors. Am J Surg Pathol 2009;33:626-632.

- 63. Gibson JA, **Hornick JL**. Mucosal Schwann cell "hamartoma": Clinicopathologic study of 26 neural colorectal polyps distinct from neurofibromas and mucosal neuromas. Am J Surg Pathol 2009;33:781-787.
- 64. Brock JE, **Hornick JL**, Richardson A, Dillon D, Lester SC. A comparison of estrogen receptor SP1 and 1D5 monoclonal antibodies in routine clinical use reveals similar staining results. Am J Clin Pathol 2009;132:396-401.
- 65. Boland JM, Folpe AL, **Hornick JL**, Grogg KL. Clusterin is expressed in normal synoviocytes and in tenosynovial giant cell tumors of localized and diffuse types: Diagnostic and histogenetic implications. Am J Surg Pathol 2009;33:1225-1229.
- 66. Baba Y, Nosho K, Shima K, Freed E, Irahara N, Philips J, Meyerhardt JA, **Hornick JL**, Shivdasani RA, Fuchs CS, Ogino S. Relationship of CDX2 loss with molecular features and prognosis in colorectal cancer: Implications for clinical and pathology practice. Clin Cancer Res 2009;15:4665-4673.
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## **Thesis**

Hornick JL. Engineering antibodies and antibody-cytokine fusion proteins for the treatment of human malignancies [dissertation]. Los Angeles (CA): University of Southern California; 1997.

## Narrative report

I am the Director of Surgical Pathology and Director of the Immunohistochemistry Laboratory at the Brigham and Women's Hospital. Within the Department of Pathology, I am a member of the Education Committee, the Clinical Operations Committee, and the Resident Recruitment and Selection Committee. I co-chair the Tissue Committee at the Brigham and Women's Hospital. I am on the Executive Committee of the Mastocytosis Center and a member of the Cancer Committee at the Dana Farber/Brigham and Women's Cancer Center and the Steering Committees for the Center for Esophageal and Gastric Cancer, the Pancreaticobiliary Tumor Center, and the Center for Cancer Precision Medicine at the Dana Farber/Brigham and Women's Cancer Center.

My expertise and commitment to clinical innovation have been recognized by my contributions to major national and international organizations. I participated in the consensus and editorial working group for the 4th edition of the World Health Organization (WHO) Classification of Tumors of Soft Tissue and Bone and currently serve as an expert member of the editorial board for the 5th edition. I served as a member of the Soft Tissue Sarcoma Expert Panel for the American Joint Committee on Cancer (AJCC) Staging System and the Sarcoma Analysis Working Group of The Cancer Genome Atlas. I chaired the Immunohistochemistry Committee of the College of American Pathologists, leading the proficiency testing program that helps maintain quality for thousands of immunohistochemistry laboratories. I previously chaired the Abstract Review Board and Abstract Assignment Committee and currently chair the Education Committee of the United States and Canadian Academy of Pathology (USCAP), overseeing the academic and educational content of one of the largest pathology conferences in the world. I serve on the Councils of the Association of Directors of Anatomic and Surgical Pathology and the Arthur Purdy Stout Society of Surgical Pathologists, leading educational and practice improvement organizations in anatomic pathology. I also serve on the Test Development and Advisory Committee for Anatomic Pathology for the American Board of Pathology. I serve on the editorial boards of twelve journals, including Modern Pathology and the American Journal of Surgical Pathology, the leading journals in surgical pathology, and hold senior leadership positions on the editorial boards of Histopathology (Regional Editor for North America), Advances in Anatomic Pathology (Associate Editor), Surgical Pathology Clinics (Consulting Editor), and Archives of Pathology and Laboratory Medicine (Executive Advisory Board). I am an Associate Editor for Sternberg's Diagnostic Surgical Pathology, one of the most widely used reference textbooks in anatomic pathology. The focus of my clinical and translational research efforts is outlined below.

Soft tissue sarcomas are a rare and heterogeneous group of neoplasms with marked differences in metastatic potential and clinical course. Accurate diagnosis is critical for prognostication and appropriate patient management. However, given the rarity of sarcomas and their overlapping histologic appearances, surgical pathologists have great difficulty diagnosing these tumor types reproducibly. Over the past several decades, the molecular pathogenetic basis for many soft tissue tumors has been identified, including chromosomal translocations, deletions, amplifications, and mutations. In order to provide objective and more widely available methods for diagnosis, I have focused on the development of protein-based diagnostic biomarkers for soft tissue tumors that correlate with molecular genetic alterations, which can be evaluated by immunohistochemistry. Many of the markers we introduced have dramatically changed clinical practice and have become standard of care for confirming the histologic diagnosis of these rare tumor

types. Examples of these markers include INI1 (SMARCB1) for epithelioid sarcoma (Am J Surg Pathol 2009;33:542-550); MUC4 for low-grade fibromyxoid sarcoma and sclerosing epithelioid fibrosarcoma (Am J Surg Pathol 2011;35:733-741 and Am J Surg Pathol 2012;36:1444-1451); retinoblastoma for spindle cell/pleomorphic lipoma, mammary-type myofibroblastoma, and cellular angiofibroma (Am J Surg Pathol 2012;36:1119-1128); STAT6 for solitary fibrous tumor (Mod Pathol 2014;27:390-395); ALK for epithelioid fibrous histiocytoma (Mod Pathol 2015;28:904-12); ROS1 for inflammatory myofibroblastic tumor (Mod Pathol 2015;28:732-739); CAMTA1 for epithelioid hemangioendothelioma (Am J Surg Pathol 2016;40:94-102); H3K27me3 (histone H3 with lysine 27 trimethylation) for malignant peripheral nerve sheath tumor (Mod Pathol 2016;29:4-13); ETV4 for sarcomas with *CIC* rearrangements (Mod Pathol 2016;29:1324-1334); and FOSB for pseudomyogenic hemangioendothelioma and epithelioid hemangioma (Am J Surg Pathol 2017;41:596-606).

Gastrointestinal stromal tumors (GISTs) are the most common mesenchymal neoplasms of the gastrointestinal tract. Most GISTs are driven by mutations in (and constitutive activation of) the receptor tyrosine kinase gene KIT, or, less often, PDGFRA; tyrosine kinase inhibitor therapies are effective treatments for many patients with advanced GIST. Around 10% of GISTs (often referred to as "wild-type" GISTs) lack such mutations and do not respond to these targeted therapies. I have investigated the pathogenesis of this subset of GISTs and have recognized that the majority of such tumors have distinctive clinical and pathologic features; moreover, these tumors can be identified based on their histologic appearances (Am J Surg Pathol 2011;35:495-504). These tumors are driven by mutations in the succinate dehydrogenase (SDH) complex subunit genes and have therefore become known as "SDH-deficient GISTs"; the diagnosis can be confirmed by immunohistochemistry (loss of expression of SDHB is limited to SDH-deficient GISTs; Histopathology 2012;61:801-809). We demonstrated that SDH-deficient GISTs are associated with decreased production of 5hydroxymethylcytosine, implicating global hypermethylation in the development of these tumors (Mod Pathol 2013;26:1492-1497). We also showed that loss of SDHA protein expression specifically identifies tumors with SDHA mutations (Mod Pathol 2013;26:289-294) and that conventional risk stratification criteria do not predict progression of SDH-deficient GISTs (Am J Surg Pathol 2016;40:1616-1621). These studies have changed surgical pathology practice such that SDH-deficient GISTs can be diagnosed more reproducibly.

Another major focus of my research is defining diagnostic criteria for soft tissue tumors and identifying features associated with malignancy and aggressive behavior. For example, we first identified hybrid schwannoma/perineurioma, a distinctive benign nerve sheath tumor unassociated with neurofibromatosis or other neurocristopathies (Am J Surg Pathol 2009;33:1554-1561); we demonstrated that dedifferentiated liposarcomas could show "homologous" lipoblastic differentiation in the higher grade component, resembling pleomorphic liposarcoma (Am J Surg Pathol 2010;34:1122-1131); and we reported an aggressive epithelioid variant of inflammatory myofibroblastic tumor with distinctive histology, a unique pattern of ALK expression, and a characteristic gene fusion (Am J Surg Pathol 2011;35:135-144). In recognition of my significant contributions to clinical innovation in surgical pathology, I received the 2012 Arthur Purdy Stout Society of Surgical Pathologists Annual Prize and the 2014 Jack Yardley Investigator Award from the Gastrointestinal Pathology Society.

In terms of pathology education, I am dedicated to teaching residents, fellows, and practicing pathologists diagnostic approaches to soft tissue tumors, gastrointestinal pathology, and applications of diagnostic immunohistochemistry. I am co-director of the Surgical Pathology Update course at Brigham and Women's Hospital, co-director of the Diagnostic Pathology Update course for the USCAP, and director of the Interactive Microscopy Soft Tissue Pathology course for USCAP. I was previously moderator of the Bone and Soft Tissue Pathology specialty conference at the USCAP annual meeting. I regularly lecture in Harvard continuing medical education courses and have delivered more than 100 invited lectures for departmental grand rounds and national and international conferences. I routinely participate in symposia at International Academy of Pathology congresses and the European Congress of Pathology, and I have taught three consecutive three-year short courses at the USCAP annual meetings. I am the Editor of the textbook *Practical Soft Tissue Pathology*, which serves as a guide to the diagnosis of mesenchymal neoplasms for pathology residents, fellows, and practicing pathologists; the 2<sup>nd</sup> edition of this textbook was recently published.

In summary, I am dedicated to the advancement of diagnostic surgical pathology through improving tumor classification, defining histologic parameters that predict outcome, translating discoveries in basic biomedical research to clinical practice, and teaching approaches to diagnostic pathology to trainees and practitioners. I look forward to continuing to train future academic and practicing surgical pathologists.