Jill M. Hagenkord, M.D.
Department of Pathology and
Creighton Medical Laboratories
Creighton University School of Medicine
601 N 30th St. Room 2400
Omaha, NE 68131-2197
Office: 402.280.3857
JillHagenkord@creighton.edu

Education

University of Pittsburgh Medical Center, Pittsburgh, PA. Molecular Genetic Pathology Fellowship, Department of Pathology, Division of Molecular Diagnostics.	2007-2008
University of Pittsburgh Medical Center, Pittsburgh, PA. Pathology/Oncology Informatics Fellowship, Departments of Biomedical Informatics and Pathology.	2006-2007
University of Iowa Hospitals and Clinics, Iowa City, IA. Pathology residency, AP/CP.	2002-2006
University of California San Francisco, San Francisco, CA. Pathology residency, AP.	1999
Stanford University School of Medicine, Palo Alto, CA. MD	1995-1999
Columbia University, New York, NY. Visiting undergraduate/Pre-medical.	1993
University of Iowa, Iowa City, IA. B.A., History with Honors.	1987-1994
University of California, Continuing Education. The Drug Development Process, Essentials of Marketing, Effective Out-sourcing to CRO's, Preclinical Development and Discovery, Functional Genomics.	2000-2002

Positions and Employment

Creighton University Medical Center, Assistant Professor 2008-present
Director of Molecular Pathology, Clinical Genomics, and Informatics.

Deltagen, Inc., Redwood City, CA 2000-2002
Title: Pathologist
Responsibilities and Contributions:
Pathologist: Anatomic and clinical pathology of genetically engineered mice; developed protocols and managed necropsy and digital imaging laboratories; wrote training manuals for pathologists, imaging, and necropsy; created an annotated mouse histology atlas.
Information Technology Liaison: Database manager for Phenotypic Analysis Department; developed, implemented, trained, and maintained data entry and QA/QC systems for pathology, imaging, densitometry, and necropsy; participated heavily in the overall design and training for the corporate database product.
Commercial Development: Wrote and maintained the corporate Phenotypic Analysis Program presentation; presented to clients, potential clients, scientific advisory board, and investors; represented the company at national and international conferences.
Consultant, New Technology in Phenotypic Analysis of Genetically Engineered Mice: Densitometer, x-ray, gross photography, necropsy techniques, Doppler ultrasonography, EKG, blood pressure, fundus photography and angiography, metabolic chambers, exercise treadmills, infrared thermograpy, intraocular pressure, metabolite mass spectrometry, microPET, microCT, microMR.
Cardiovascular and Metabolic Programs: Directed laboratory of 12 people, including

two MDs and 1 PhD scientist; screened 250 cohorts per year for resistance to weight gain and/or diet-induced glucose tolerance and presented findings to chemists, VP of Clinical Trials, business development team, investors, intellectual property team, and potential collaborators; selected assays, designed studies, wrote protocols, purchased equipment, established laboratories and animal space, designed budgets.

Biomedical Database Design 2002-present
SNP array Virtual Karyotyping Data Management Database, Creighton Medical Laboratories; Mouse Colony Management Database, University of Iowa. Laboratory Management Database, Heusel Laboratory, University of Iowa. Lasik Outcomes Database, Dr. Richard Maw, Lasik Plus, Las Vegas, NV. HCV Genotype and Viral Load Database, University of Iowa Molecular Pathology.

Certification and Licensure

Molecular Genetic Pathology, board eligible (test date 09/11/2009)	2008
Diplomate, American Board of Pathology, Clinical Pathology	2006
Nebraska State Medical License	2008-present
Iowa State Medical License	2008-present
Pennsylvania State Medical License	2006-2008

Professional Memberships and Activities

College of American Pathologists	2002-present
United States and Canadian Academy of Pathology	2002-present
American Society of Clinical Pathologists	2002-present
Association for Pathology Informatics	2005-present
American Society for Investigative Pathology	2005-present
Association for Molecular Pathology	2003-present
Association for Molecular Pathology, Economic Affairs Committee	2008-present

Honors and Awards

Phi Beta Kappa, University of Iowa.
President's List, University of Iowa.
Dean's List, University of Iowa.
GE Research Scholarship, University of Iowa, 1992.
GE Teaching Scholarship, University of Iowa, 1992.
Medical Scholars Research Grant, Stanford University, 1998.
CAP Foundation Informatics Travel Award, APIII, 2005.
CAP Foundation Travel Award, Lab Info Tech Summit, 2005.
George D. Pennick Award for Excellence in Teaching, University of Iowa Hospitals, 2006.
1st place clinical research, University of Pittsburgh Department of Pathology Retreat, 2007.
SASS Foundation Research Fellowship, $40,000 grant awarded but not accepted, 2007.
Association of Molecular Pathology Young Investigator Award, 2007.
1st place clinical research, University of Pittsburgh Department of Pathology Retreat, 2008.
College of American Pathologists Spokesperson Training Scholarship, 2009.

Educational Activities

Instructor, Pathology Informatics, University of Pittsburgh Department of Pathology, Lectured in LIS Basics, Practical Bioinformatics for Pathologists, and Specialty Laboratory Informatics to the pathology residents as part of their pathology informatics rotation. 2007

Course Designer, Virtual Rotation in Pathology Informatics, University of Pittsburgh Departments of Biomedical Informatics and Pathology. Freely available web course bringing the expertise of UPMC pathology informatics to residency programs across the country. https://secure.opi.upmc.edu/VRPI/index.cfm 2007

Course Designer, Virtual Informatics Rotation for Pathology Residents, **University of Iowa Hospitals and Clinics**. Designed a self-paced, web-based informatics course using commercial course management software. 2006

JM Hagenkord, T Winder, J Heusel, The Molecular Pathology Survival Guide, University of Iowa Hospitals and Clinics, 2005. 2005

Teaching Assistant, Department of Pathology, University of Iowa School of Medicine. General Pathology case analysis course for second year medical students. Provided gross and microscopic demonstration of disease, case presentation skills, clinicopathologic correlation, and differential diagnoses skills. 2002-2006

Teaching Assistant, Department of Pathology, UCSF School of Medicine. General Pathology laboratory course for second year medical students. Provided gross and microscopic demonstration of disease, use of microscopes/instruments, performance of post-mortem examinations. 1999

Teaching Assistant, Department of Pathology, Stanford University School of Medicine. General Pathology course for second year medical students. Conducted weekly review sessions for 100 students, formulated and graded weekly problem sets, graded exams, assisted with laboratory instruction. 1996-1997

GE Teaching Internship, Department of Chemistry, University of Iowa. Assisted Dr. Vasu Nair in teaching Organic Chemistry II. Evaluated student work, conducted weekly review sessions, lectured, formulated examination questions. 1992

Research

STATE OF NE LB595 (PI: Hagenkord) 07/01/2008-06/30/2011
Genome-wide Detection of Copy Number Changes and Loss of Heterozygosity in Myelodysplastic Syndrome Using Affymetrix 250K SNP Arrays
Determine if high-resolution SNP arrays will detect characteristic and/or predictive chromosomal aberrations in MDS missed by cytogenetics and FISH. The primary goals of this project are to demonstrate the feasibility of using SNP arrays to detect novel genetic lesions in MDS, including those associated with progression to leukemia.

Clinical Genomics Facility, University of Pittsburgh Cancer Institute. Supervisor: Federico Monzon, MD, Associate Professor of Pathology and Biomedical Informatics, Director Clinical Genomics Facility. Design and validation of multi-analyte platform tests for clinical applications, including SNP arrays for assessment of copy number and loss-of-heterozygosity in human tumors and microarray expression analysis. 2006-2008

Molecular Diagnostics Laboratory, University of Iowa Hospitals and Clinics. Supervisors: Peter Nagy, MD, PhD and Jonathan Heusel MD, PhD, Assistant Professors of Pathology. Validated microsatellite instability assay using Abbott 3130 genetic analyzer for detection of Lynch Syndrome and sporadic microsatellite unstable colorectal carcinomas. 2005

Mayo Clinic and University of Iowa SPORE Lymphoma Project, Departments of Pathology and Internal Medicine, University of Iowa Hospitals and Clinics. Supervisor:

Michael Knudson, MD, PhD, Associate Professor of Pathology. Title of Project: Bcl-2 Gene Family and Lymphomagenesis. Complete phenotypic characterization of three mouse models of lymphoma, including clinical history, physical examination, hematology, peripheral blood smear, necropsy, histology, and immunohistochemistry. Microarray expression analysis of lymphoma models using Affymetrix murine arrays and software. 2002-2003

Medical Scholars Research Grant, Stanford University Hospital, Molecular Pathology Laboratory, Department of Pathology. Supervisor: James Zehnder, MD, Associate Professor of Pathology and Medicine. Title of Project: Molecular Diagnosis of Thrombophilia. Used heteroduplex analysis to screen samples from thrombophilic patients for point mutations associated with hypercoagulability. Subsequently developed heteroduplex assay for simultaneously detecting both C282Y and H63D mutations for hemochromatosis testing. 1998

Undergraduate Research, University of Iowa, Department of Chemistry. Supervisor: Vasu Nair, PhD, DSc. GE Research Grant to synthesize and isolate novel dideoxynucleosides with potential antiviral activity and enzymological analysis of potentially active antiviral compounds as substrates of adenosine deaminase. 1994-1995

Abstracts and Presentations

Oral Presentations

1. Clinical Genomics and Biomarker Discovery, featured speaker. Sponsored by Affymetrix, Inc. July 2009, Harvard University (Boston, MA), University of Pennsylvania (Philadelphia, PA) and Denver University (Denver, CO).
2. Johns Hopkins Medical Institutions, Baltimore Maryland. Department of Pathology, Molecular Pathology Seminar Series, SNP Array Karyotyping for Clinical Cancer Applications. June 2009.
3. ARUP Laboratories, Genetics and Cytogenetics Conference Series. SNP Array Karyotyping for Clinical Cancer Applications. May 2009.
4. University of Nebraska Medical Center, Department of Pathology, Hematopathology Research Conference. SNP Array Karyotyping of Hematologic and Solid Tumors. Omaha, NE, November 2008.
5. APIII 2008, invited speaker. DNA Copy Number Arrays: Ready for the Clinic but Waiting for a LIMS. Pittsburgh, PA, October 2008.
6. Association of Molecular Pathology 2008, Platform Presentations of Selected Abstracts - Solid Tumors. Detection of Chromosomal Aberrations in Renal Tumors: A Comparative Study of Conventional Cytogenetics and Virtual Karyotyping with SNP Microarrays. Dallas, TX, October 2008.
7. University of Pittsburgh Department of Pathology, Invited speaker, Departmental Retreat 2008. Virtual Karyotyping with SNP microarrays reduces uncertainty in the diagnosis of renal epithelial tumors with challenging morphologic appearance.
8. Department of Biomedical Informatics, University of Pittsburgh, August 2007. DNA Genome Arrays: A Beginner's Guide.
9. Grand Rounds, Department of Pathology, University of Iowa Hospitals and Clinics, September 2003. Phenotypic Analysis of Hematopoietic Malignancies in Genetically Engineered Mice.
10. Genomics and Medicine, University of Iowa Hospitals and Clinics, September 2003. Primer on Microarrays for MD's Part I: What is a Microarray and Why Should I Care?
11. Genomics and Medicine, University of Iowa Hospitals and Clinics, October 2003. Primer on Microarrays for MD's Part II: How to Read and Critically Assess Microarray Literature.

Posters and Abstracts

1. **Hagenkord JM**, Parwani AV, Lyons-Weiler MA, Alvarez K, Amato R, Gatalica Z, Gonzalez-Berjon JM, Peterson L, Dhir R, Monzon FA. Virtual karyotyping with SNP microarrays reduces uncertainty in the diagnosis of renal epithelial tumors. UPMC Department of Pathology Retreat 2008 (1st place).
2. **Jill Hagenkord**, Maureen Lyons-Weiler, Anil Parwani, Rajiv Dhir, Federico Monzon, DNA Genome Arrays as an Ancillary Study for the Diagnosis of Morphologically Challenging Renal Epithelial

Tumors, Association for Molecular Pathology, 2007, Los Angeles, CA.
3. **Jill Hagenkord**, George Johnson, Fred Dee, Pathology Informatics Training for Residents: A Virtual Solution, APIII 2006, Vancouver, BC. Archives of Pathology and Laboratory Medicine: 2007 Vol. 131, No. 5, pp. 805–821.
4. **JM Hagenkord**, M Lyons-Weiler, R Dhir, A Parwani, FA Monzon, Loss-of-Heterozygosity and Chromosomal Copy Number Analysis in Paraffin Embedded Tissues Using Whole Genome 10K 2.0 SNP Arrays, United States and Canadian Academy of Pathology 2007, San Diego, CA.
5. **JM Hagenkord**, FA Monzon and AV Parwani, Residency Training in Pathology Informatics: A Virtual Rotation Solution, United States and Canadian Academy of Pathology 2007, San Diego, CA.
6. **Jill Hagenkord**, Maureen Lyons-Weiler, Christin Sciulli, Rajiv Dhir, Federico Monzon. Detection of Characteristic Chromosomal Aberrations in Renal Epithelial Tumors Using Whole Genome SNP Arrays. The University of Pittsburgh Clinical and Translational Science Day 2007 and UPMC Department of Pathology Retreat (1st place).

Publications

1. Hyunseok P. Kang, **Jill A. Hagenkord**, Federico A. Monzon, Anil V. Parwani. Residency Training in Pathology Informatics: A Virtual Rotation Solution. *Am J Clin Pathol*, 2009, in press.
2. Thomas G. McConnell, M.D., Alexis Norris-Kirby, **Jill M. Hagenkord, MD**, Brigitte M. Ronnett, M.D., and Kathleen M. Murphy, Ph.D. Complete Hydatidiform Mole with Retained Maternal Chromosomes 6 and 11. *Am J Surg Pathol*, 2009, in press.
3. Hyun-Jung Kim M.D., Steven S. Shen M.D., Ph.D., Alberto G. Ayala M.D., Jae Y. Ro M.D., M.S., Ph.D., Luan D. Truong M.D., Karla Alvarez B.Sc., Julia A. Bridge M.D., Zoran Gatalica M.D., **Jill M. Hagenkord M.D.**, José M. Gonzalez-Berjon M.D., and Federico A. Monzon M.D. Virtual-Karyotyping with SNP microarrays in morphologically challenging renal cell neoplasms: a practical and useful diagnostic modality. *Am J Surg Pathol*, 2009, in press.
4. **Hagenkord JM** and Chang CC, The rewards and challenges of array-based karyotyping for clinical oncology applications, *Leukemia*, 2009 May, in press.
5. Federico A Monzon, Karla Alvarez, Zoran Gatalica, Julia A Bridge, Marilu Nelson, Hyun-Jung Kim, **Jill M Hagenkord**. Detection of chromosomal aberrations in renal tumors: a comparative study of conventional cytogenetics and virtual karyotyping with SNP microarrays. *Arch Pathol Lab Med*, 2009, in press
6. Huang WT, Yang X, Zhou X, Monzon FA, Wen J, **Hagenkord JM**, Wu LY, Keever-Taylor C, Novoa-Takara L, Wong ST, Young K, Chang CC. Multiple distinct clones may co-exist in different lineages in myelodysplastic syndromes. *Leuk Res* 2008 Dec 10.
7. **Hagenkord JM**, Parwani AV, Lyons-Weiler MA, Alvarez K, Amato R, Gatalica Z, Gonzalez-Berjon JM, Peterson L, Dhir R, Monzon FA. Virtual karyotyping with SNP microarrays reduces uncertainty in the diagnosis of renal epithelial tumors. *Diagn Pathol*. 2008 Nov 6;3:44.
8. **Jill Hagenkord** and Federico Monzon, Maureen Lyons-Weiler, Christin Sciulli, Jyoti Balani, Jia Li, Uma Chandran, Sheldon Batasky, Anil Parwani, Rajiv Dhir. Whole-Genome SNP Arrays as Potential Diagnostic Tool for the Detection of Characteristic Chromosomal Aberrations in Renal Epithelial Tumors. *Mod Pathol*, 2008 May;21(5):599-608.
9. **JM Hagenkord** and M Lyons-Weiler, R Dhir, A Parwani, FA Monzon. Optimization of the Affymetrix GeneChip Mapping 10K 2.0 Assay for Routine Clinical Use on Formalin Fixed Paraffin Embedded Tissues, *Diagn Mol Pathol*, 2008 Mar;17(1):3-13.
10. Catherine I. Dumur, Maureen Lyons-Weiler, Christin Sciulli, Carleton T. Garrett, Iris Schrijver, Tara K. Holley, Juan Rodriquez-Paris, Jonathan R. Pollack, James L. Zehnder, Melissa Price, **Jill M. Hagenkord**, C. Ted Rigl, Ljubomir J. Buturovic, Glenda A. Anderson, and Federico A. Monzon, Interlaboratory Performance of a Microarray-Based Gene Expression Test to Determine Tissue of Origin in Poorly Differentiated and Undifferentiated Cancers, *Journal of Molecular Diagnostics*, 2008.
11. P Roy-Burman, H Wu, WC Powell, **JM Hagenkord**, MB Cohen, Genetically defined mouse models that mimic natural aspects of human prostate cancer development, *Endocrine-Related Cancer*. 2004 Jun;11(2):225-54.

Work in Progress

Jill Hagenkord, Federico Monzon, Shera Kash, Stan Lilleberg, Qingmei Xie, Jeffery Kant. Array-based Karyotyping for Prognostic Assessment in Chronic Lymphocytic Leukemia: Performance Comparison of Affymetrix™ 10K2.0, 250K Nsp, and SNP6.0 Arrays. *Leukemia*, 2009, submitted.

Semir Vranic, MD, Ossama Tawfik MD, PhD, Nurija Bilalovic MD, PhD, Eduardo Eyzaguirre, MD, Lisa MJ Lee, PhD, Patrick Adegboyega, MD, **Jill Hagenkord, MD** and Zoran Gatalica, MD, DSc, EGFR and HER-2/neu expression in invasive apocrine carcinoma of the breast. *Cancer*, 2009 submitted.

Lamis Shatat, Zoran Gatalica, Julia Bridge, Brian Loggie, **Jill Hagenkord**, Conventional and Array-based Karyotypes of Peritoneal Mesotheliomas. In progress.

Jill Hagenkord, Maureen Lyons-Weiler, Federico Monzon, Ian Pollack, Robert Sobol. SNP Arrays for Genome-wide Assessment of Chromosomal Copy Number Changes and Loss of Heterozygosity in Pediatric Glial Tumors: Correlation with Clinical Outcomes, in progress.