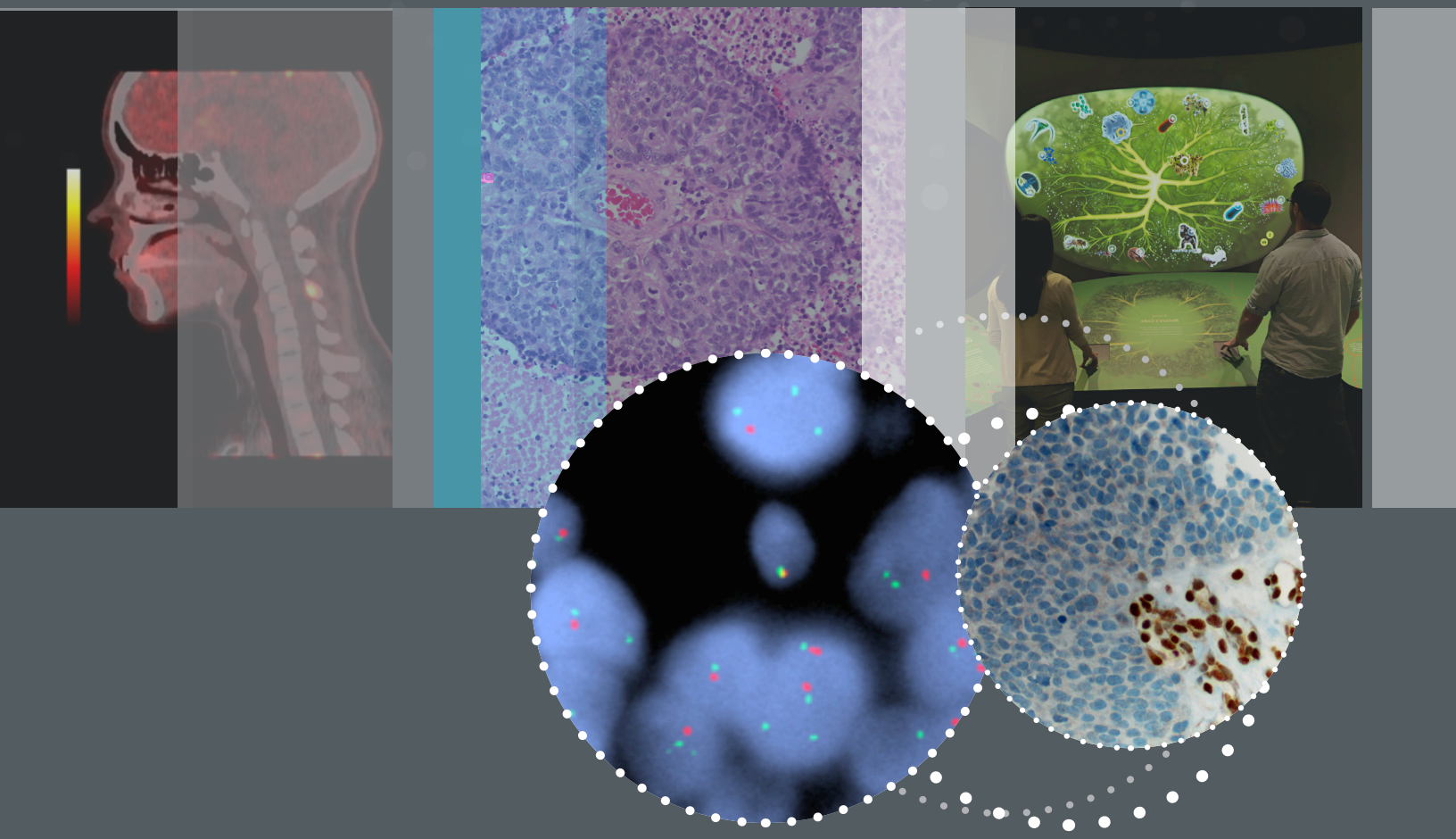
NEW GENOMICS COURSE FOR PATHOLOGY TRAINEES



Jan 6-10, 2014 Vancouver General Hospital Taylor-Fidler Auditorium

NEW GENOMICS COURSE FOR PATHOLOGY TRAINEES

JAN 6-10, 2014


Sohrab Shah


Stephen Yip

We have developed a highly integrative, practical and focused approach to genomics teaching for residents and trainees in the Department of Pathology and Laboratory Medicine to be offered as a 1 week intensive program in Jan 2014. Simple genetic tests with a limited detection threshold are gradually being replaced by multiplex, deeply interrogative assays which coincide with the recent revolutions in massively parallel sequencing and advanced molecular profiling technology. This is further propelled by simultaneous ongoing discoveries of novel cancer pathway aberrations that drive the development and clinical application of novel targeted therapeutics. More questions are being asked of the pathologist and biopsied tissues are getting smaller. This course provides the residents a review and refresher of relevant topics in genomics and epigenomics followed by a survey of available clinically significant molecular diagnostic assays as well as bioinformatic tools.

Genomic medicine and lab medicine, especially pathology, are natural and symbiotic partners in the future of patient care. In many cases, molecular diagnostic assays complement rather than supplement "glass-based" pathology. For example, correct identification of tumor cells and estimation of tumor fraction facilitates downstream analysis. In an era of personalized medicine, understanding of the genomic and epigenomic makeup of a disease lesion, via the appropriate application of advanced molecular tests and bioinformatic analytic tools, represents a logical progression from special stains to epitope-specific antibodies to genetic tests, for making an accurate and informative diagnosis. We will draw from the community of local experts at UBC, the Michael Smith Genome Sciences Centre, the Centre for Disease Control and the BC Cancer Agency in the fields of molecular pathology, molecular biology, microbiology, bioinformatics and genomics to offer an immersive introductory program on current state of the art and emergent technologies and their applications.

UBC Pathology Genomics/Bioinformatics Core

- Provide clinical trainees and graduate students in the Department of Pathology & Laboratory Medicine with an inclusive yet focused and practical course on molecular diagnostic assays relevant to anatomical pathology, hematopathology, medical biochemistry, medical microbiology, and neuropathology.
- Acknowledge that this is a rapidly- evolving field with constantly changing technology as well as expectations and demands from the end-users. The course will include the most up-to-date topics and will also briefly touch on issues such as ethical/medico-legal concerns (including DTC genomics such as 23andMe). However, given the limited time frame of the course these topics may be discussed in detail in subsequent lectures.
- The course will review basic concepts of molecular genetics and how aberrations in the genome/epigenome can lead to phenotypic changes from congenital malformations to cancers, liquid and solid. This is followed by survey of the available molecular diagnostic assays used to identify these changes and review of tests "on the horizon".
- The course will devote significant amount of time and resources into survey of open source bioinformatic tools and resources and how they can be utilized in laboratory medicine – in clinical practice or as part of research project.
- Survey of relevant topics on pathogen genomics (eg. rapid identification of pathogens in an outbreak), microbiome, and liquid-based diagnostics (biochemistry) will be included.
- There will be a discussion on "careers" in molecular diagnostics with active participation by current fellows.
- Highlight the local expertise and resources in advanced translational genomics to trainees and clinical staff to foster collaborations.
- Guest speaker should be experienced in advanced molecular diagnostics and highlight his/her contribution(s) to the field. Also, there should be interactions with the trainees to facilitate career development.

INAUGURAL KEYNOTE SPEAKER

Anthony John Iafrate, MD, PhD
Associate Professor in Pathology, Harvard Medical School
aiafrate@partners.org

Dr. John Iafrate is a board-certified Pathologist who joined the MGH staff in 2005 and directs a clinical laboratory for molecular diagnostics at MGH and oversees a translational research laboratory that supports both Pathology and the MGH Cancer Center. He is an MD-PhD having received his dual degree from the State University of New York at Stony Brook in 2000 and was trained in Anatomic and Molecular Genetic Pathology at Brigham and Women's Hospital.

His post-doctoral work involved the discovery and description of a novel source of human genetic diversity termed copy number variation (CNV). Since arriving at MGH, he has established a cancer diagnostics lab focusing on genetic fingerprints that help guide novel and targeted therapies. His laboratory launched Snapshot several years ago, an assay that tests over 100 of the most common mutations in tumors. His research is focused on lung and brain tumors, and he has been closely involved in the clinical development of crizotinib and companion diagnostics in ALK-positive lung cancers. Dr. Iafrate has published over 100 papers with heavy emphasis on molecular pathology, diagnostics, and personalized medicine.

Selected publications:

1. Awad MM, Katayama R, McTigue M, Liu W, Deng YL, Brooun A, et al. Acquired resistance to crizotinib from a mutation in CD74-ROS1. T*he New England journal of medicine.* 2013;368(25):2395-401.
2. Ou SH, Bartlett CH, Mino-Kenudson M, Cui J, Iafrate AJ. Crizotinib for the treatment of ALK-rearranged non-small cell lung cancer: a success story to usher in the second decade of molecular targeted therapy in oncology. *The oncologist.* 2012;17(11):1351-75.
3. Bergethon K, Shaw AT, Ou SH, Katayama R, Lovly CM, McDonald NT, et al. ROS1 rearrangements define a unique molecular class of lung cancers. *Journal of clinical oncology* : Official *Journal of the American Society of Clinical Oncology.* 2012;30(8):863-70.
4. Snuderl M, Fazlollahi L, Le LP, Nitta M, Zhelyazkova BH, Davidson CJ, et al. Mosaic amplification of multiple receptor tyrosine kinase genes in glioblastoma. *Cancer cell.* 2011;20(6):810-7.
5. Kwak EL, Bang YJ, Camidge DR, Shaw AT, Solomon B, Maki RG, et al. Anaplastic lymphoma kinase inhibition in non-small-cell lung cancer. *The New England journal of medicine.* 2010;363(18):1693-703.
6. Wu D, Vu Q, Nguyen A, Stone JR, Stubbs H, Kuhlmann G, et al. In situ genetic analysis of cellular chimerism. Nature medicine. 2009;15(2):215-9.

A Glimpse of Some of Our Outstanding 2014 Speaker Line-up:

"The UBC Pathology Genomics Core Teaching course is a self-approved group learning activity (Section 1) as defined by the Maintenance of Certification program of the Royal College of Physicians and Surgeons of Canada."

Michael S. Anglesio, PhD
Research Associate, Department of Pathology and Laboratory Medicine
BC Cancer Research Centre
manglesio@bccrc.ca

Michael M. Burgess, PhD
Chair in Biomedical Ethics at the W. Maurice Young Centre for Applied Ethics and the Department of Medical Genetics at the University of British Columbia
mburgess@ethics.ubc.ca

Bruce Carleton, B.Pharm, Pharm.D.
Senior Clinician Scientist, CFRI, Professor, Department of Pediatrics, UBC
Director, Pharmaceutical Outcomes Programme, BCCH
bcarleton@popi.ubc.ca

Hector Li-Chang, MD, FRCPC
Research Fellow
Department of Molecular Oncology
British Columbia Cancer Agency
hlichang@bccrc.ca

William Hsiao, PhD
Clinical Assistant Professor,
Department of Pathology and Laboratory Medicine, UBC
william.hsiao@bccdc.ca

David Huntsman MD, FRCPC, FCCMG
Professor, Departments of Pathology and Laboratory Medicine and Obstetrics and Gynaecology , UBC; Dr. Chew Wei Memorial Professor of Gynaecologic Oncology
dhuntsma@bccancer.bc.ca

Martin Hirst, PhD
Head of Epigenomics, Michael Smith Genome Sciences Centre, BCCA, Assistant Professor, Dept. of Microbiology and Immunology, Centre for High-Throughput Biology, UBC
hirst@chibi.ubc.ca

Janessa Laskin, MD, FRCPC
Medical Oncologist
BC Cancer Agency
jlaskin@bccancer.bc.ca

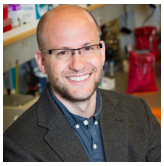
Ryan D. Morin, MSc, PhD
Assistant Professor, SFU; Affiliations: Dept of Molecular Biology and Biochemistry and School of Computing Science (Associate Member), SFU,
Scientist, Genome Sciences Centre, BCCA
rdmorin@sfu.ca

Torsten Nielsen, MD, PhD, FRCPC
Professor, Departments of Pathology, University of British Columbia
Associate Professor, Orthopaedics and the Department of Urologic Sciences, UBC
torsten@mail.ubc.ca

Patrick Tang, MD, PhD, FRCPC
Clinical Associate Professor
Department of Pathology and Laboratory Medicine, UBC
Patrick.Tang@bccdc.ca

Sohrab Shah, MSc, PhD
Scientist, Department of Molecular Oncology, BC Cancer Agency; and Assistant Professor, Department of Pathology, UBC
sshah@bccrc.ca

Michael A. Seidman, MD, PhD
Advanced Cardiovascular Pathology Fellow; Centre for Heart Lung Innovation / Department of Pathology & Laboratory Medicine / St. Paul's Hospital / UBC
Michael.Seidman@hli.ubc.ca



Christian Steidl, MD
Research Scientist Department of Experimental Therapeutics BCCA-BCCRC
Member, Centre for Lymphoid Cancer (CLC)
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Stephen Yip, MD, PhD, FRCPC
Assistant Professor, Department of Pathology and Laboratory Medicine
Vancouver General Hospital
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TIMETABLE

Coffee and tea will be served in AM and after lunch. Participants are responsible for their own lunches except for Friday in which lunch will be served as part of the PALS lecture.

"The UBC Pathology Genomics Core Teaching course is a self-approved group learning activity (Section 1) as defined by the Maintenance of Certification program of the Royal College of Physicians and Surgeons of Canada."

MONDAY, JANUARY 6, 2014 [THEME - DAY 1: CONCEPTS IN MOLECULAR BIOLOGY (REVIEW)]

LOCATION: 8:30am - 12pm: Taylor-Fidler , Rm. 141 // 1pm - 4pm: Paetzold Lecture Theatre, Rm. 1891 (Jim Pattison Pavilion)

TIME	TITLE	LECTURER
0830-0900	REGISTRATION/HOUSEKEEPING (iClicker assignment ?)	Stephen Yip & Sohrab Shah
0900-1010	Introduction to course & central dogma and beyond	Stephen Yip & Sohrab Shah
1010-1025	DICER aberrations in human cancers - clinical discovery and functional consequences	Michael S. Anglesio
1030-1200	Somatic mutations and cancer - a global view of disrupted genomes and dysregulated biology	Sohrab Shah
1200-1300	**LUNCH**	
1300-1430	Sequencing technology - from sanger to illumina	Martin Hirst
1430-1600	Ethics in Genomics for Pathology and Laboratory Medicine	Michael M. Burgess

TUESDAY, JANUARY 7, 2014 THEME - DAY 2: DIAGNOSTIC TESTS IN ‚OMICS'

LOCATION: 8:30am - 4:30pm: Taylor-Fidler, Rm. 141 (Jim Pattison Pavilion)

TIME	TITLE	LECTURER
0850-0900	Feedback of 'day 1' talks	
0900-0950	Genetic tests for cardiac disorders	Michael Seidman
1000-1050	Survey of practical somatic mutation testing and pathology considerations	Hector Li-Chang
1100-1150	ALK translocation in NSCLC	Anthony John Iafrate
	BCCA ONCOLOGY GRAND ROUNDS (John Jambor Room - Vancouver Cancer Centre/BCCA)	
1200-1250	Implementation of clinical somatic mutation testing - The MGH experience	Anthony John Iafrate
1330-1420	Fusion events in malignant gliomas - functional and clinical implications	Anthony John Iafrate
1430-1520	Breast cancer molecular diagnostic assays in current use	Torsten Nielsen
1530-1630	Personalized Oncogenomics - clinical translation of genomic discoveries	Janessa Laskin

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WEDNESDAY, JANUARY 8, 2014 [THEME - DAY 3: WHOLE GENOME/TRANSCRIPTOME APPROACHES]

LOCATION: 9am- 12pm: Eye Care Centre, Rm. 100 LT // 12pm - 4pm: Taylor-Fidler, Rm 141

TIME	TITLE	LECTURER
0850-0900	Feedback of 'Day 2' talks	
0900-0950	Systems biology approaches to molecular research in cancer - TCGA	Sohrab Shah
1000-1050	Resources for human genome browsing (UCSC genome browser)	Ryan Morin
1100-1150	Basic approaches to determining human genome mutation data	Sohrab Shah
1200-1250	**LUNCH**	
1300-1400	Pharmacogenomics: The problem, the science and the solution to enhancing drug safety in children	Bruce Carleton
1400-1500	Data resources for cancer genomics (TCGA portal, etc...)	Sohrab Shah
1500-1600	The functional impact of recurrently mutated genes for tumour progression and therapy resistance in B cell lymphomas	Christian Steidl

THURSDAY, JANUARY 9, 2014 [THEME - DAY 4: MICROBIAL GENOMICS AND METAGENOMICS]

LOCATION: 8:30am - 5pm: Taylor-Fidler , Rm. 141 (Jim Pattison Pavilion)

TIME	TITLE	LECTURER
0850-0900	Feedback of 'Day 3' talks	
0930-1020	Genomics in medical microbiology (introduction to concepts, applications and lab methods)	Patrick Tang
1030-1120	Bioinformatics analysis of microbial WGS data - sequence analysis	William Hsiao
1130-1220	Bioinformatics analysis of microbial WGS data - comparative genomics	William Hsiao
1230-1320	**LUNCH**	
1330-1420	Outbreak investigations using genomics data	Patrick Tang
1430-1520	Metagenomics in medical microbiology (microbiome and pathogen discovery)	Patrick Tang
1530-1620	Bioinformatics analysis of metagenomics data	William Hsiao
1630-1650	Future directions for genomics in microbiology	Patrick Tang/ William Hsiao

FRIDAY, JANUARY 10, 2014 [THEME - DAY 5: FUTURE TRENDS - OPPORTUNITIES AND CHALLENGES AND PANEL DISCUSSION]

LOCATION: 8:30am - 5pm: Taylor-Fidler, Rm. 141 // 12:30pm - 2pm: Paetzold Lecture Theatre, Rm. 1891

TIME	TITLE	LECTURER
0850-0900	Feedback of 'Day 4' talks	
0900-1030	Implementation of advanced molecular diagnostics into everyday pathology practice	David Huntsman
1030-1200	Panel discussion - faculties	
	PROFESSIONAL ADVANCEMENT LEARNING SERIES (PALS)	
1230-1330	Patient advocate: lymphoma survivor	Jackie Ellis
1330-1400	WRAP UP	Stephen Yip & Sohrab Shah