2016

Annual Report

The Department of Pathology and Laboratory Medicine

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Schulich
MEDICINE & DENTISTRY

Western

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HIELD

Message from **THE CHAIR**

Another successful and eventful academic year has come and gone. As a proud member of this department, I am presenting you with this report, which outlines some of our achievements and challenges. Each year, we review and update our 2014-2019 Strategic Plan and we use these updates to plan our strategic directions for the coming year.

In 2016, I completed my first five-year term as Chair/Chief of Pathology and Laboratory Medicine. We completed an in-depth 5-year self-study of our department in preparation for an external review in April 2016. The outcome of this review will be very helpful for us to determine specific areas of focus for the coming years.

I am proud to lead a wonderful group of people, who are our greatest asset. The environment, teamwork, enthusiasm are palpable across our department at all levels, from clinical and basic science faculty to administrative and technical staff. We strive for excellence and welcome challenges.

A continuing major challenge for our clinical service portfolio has been the significant increase in the laboratory workload over the past few years, an increase that is most pronounced in anatomic pathology. There has not been a corresponding increase to the number of anatomical pathologists. As a result, the increasing clinical workload is affecting our academic productivity.

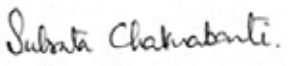
With hard work and commitment however, other areas have been able grow. In molecular genetics, for example, we have developed and implemented a large number of new tests, using cutting edge technology.

In medical microbiology much needed capital equipment has been acquired which has improved workflow and provides more timely results for patients. Request for Proposals have been approved for new Core Laboratory equipment, which will lead to future modernization, diagnostic efficiencies and increased patient safety.

All our educational programs remain healthy and continue to grow and prosper. Our educators at all levels continue to be enthusiastic and innovative. The anatomic pathology residency training program continues to thrive and our residents have again demonstrated 100 percent success at the Royal College exams. This is now a 26-year unbroken record. Our novel interdisciplinary "One Health" undergraduate program has been approved by university Senate and was launched in the fall 2016.

Our researchers, in both the clinical and basic sciences, continue to be engaged and productive. As with scientists across Canada however, there is concern with regard to changing research resources. Cuts to research funding have now reached a critical point, especially with the change in the Canadian Institutes of Health Research funding model. Despite these challenges we are seeing an increase in our research effort. Pathology and Laboratory Medicine Research Day is a prime example of this. This past spring we were delighted that Nobel Laureate Dr. Andrew Fire accepted our invitation as the keynote speaker. This event was inspiring and very well attended.

Looking back we should all feel proud of our accomplishments over the past year. As we venture forward into another year, I feel strongly that we will continue to excel in patient care, education and research.



Dr. Subrata Chakrabarti

Chair/Chief
MBBS, PhD, FRCP(c)

About the **DEPARTMENT**

The Department of Pathology and Laboratory Medicine is uniquely placed as a bridge between the basic science and clinical medicine disciplines

Translational Department

Our department is one-of-a-kind and very complex with both a basic science research department and a large clinical department. This allows us to be an effective conduit and facilitator of multidisciplinary and translational research, and cross-disciplinary teaching initiatives.

Founded: 1945

Chair/Chief: Subrata Chakrabarti

2015-16 Total Grant Funding: $5,100,000

THE DEPARTMENT AT A GLANCE
AT SEPTEMBER 2016

59
Full Time Faculty

414
Hospital Staff

33
Adjunct Appointees

17
Residents and Fellows

17
Cross Appointees

49
Graduate Students

8
Full-Time University Staff

11
BMSc Undergraduate Students

Our **MISSION**

Members of the Department of Pathology and Laboratory Medicine strive to provide a quality work environment that fosters unity, respect for diversity, teamwork and professional growth. We are committed to serve our:

PATIENTS, by providing efficient, comprehensive and high quality diagnostic services for optimal patient outcome and health. We are committed to strategies that result in continuous improvement of the quality of our services.

STUDENTS, by providing the best student experience through outstanding educational programs for undergraduate, graduate and postgraduate students, and other health care professionals within a clinical and research intensive environment. We integrate continuing medical education programs into the departmental activities.

SCIENTIFIC RESEARCH COMMUNITY AND HEALTH CARE PARTNERS, by sharing expertise, fostering interdisciplinary collaboration, and providing exemplary educational and scientific resources. We are a strong clinical and basic science department and our research endeavors include basic science, clinical and translational research.

We provide research leadership by identifying our strengths and enhancing research productivity with selective allocation of resources. We guide and collaborate with our regional partners to improve the diagnostic pathology and laboratory medicine services throughout Southwestern Ontario.

SOCIETY, by actively applying the art and science of pathology and laboratory medicine in educating the community in matters of health and disease.

Our **VISION**

Provide state-of-the-art diagnostic pathology and laboratory medicine services while achieving excellence in pathology and laboratory medicine research and education.

Our **VALUES**

TEAM WORK

We believe in a team-based problem identification and problem solving methodology. We believe in interdisciplinary networking.

INNOVATION

We are flexible and adaptable in order to meet the changing needs of society. We strongly believe in continuous quality improvement to enhance clinical performance outcomes.

LEADERSHIP

We strongly encourage members to take leadership roles in education, research and management. We support the leaders who guide our mission.

2015/16 HIGHLIGHTS

Welcome New Faculty

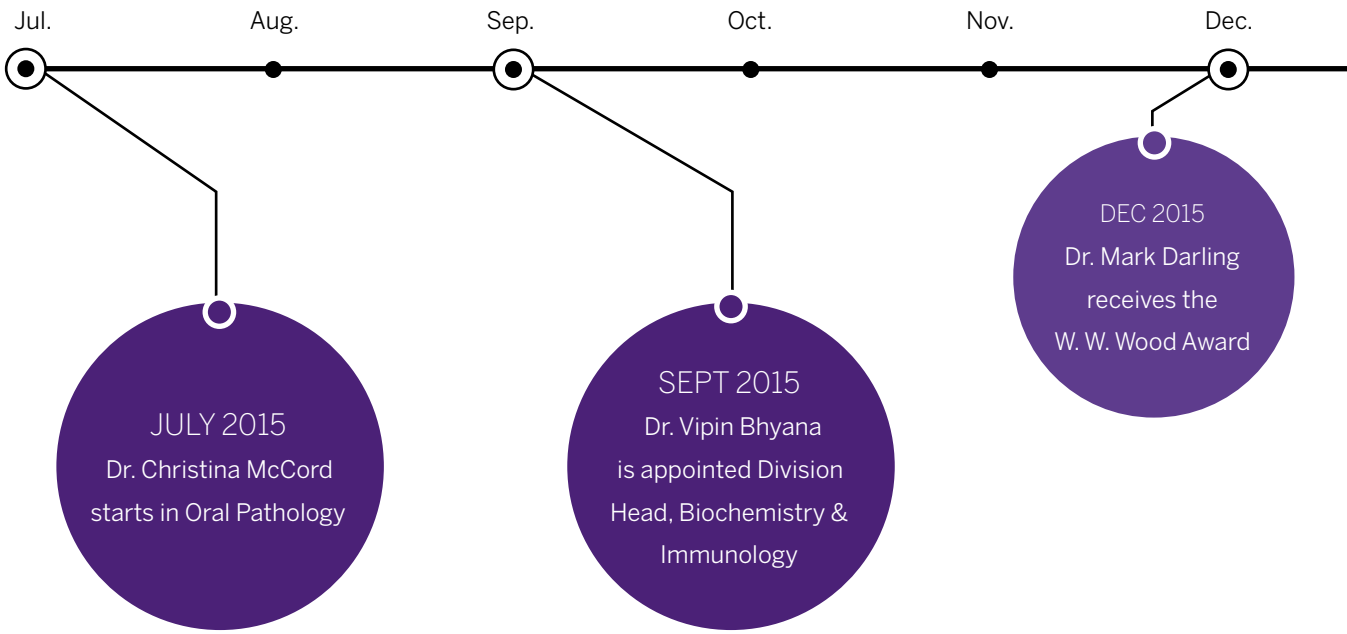
July 2015 - Dr. Christina McCord,
Oral Pathologist, Assistant Professor

August 2015 - Dr. Gerald McKinley,
Medical Anthropologist, Assistant Professor

September 2015 - Dr. Hanxin Lin,
Molecular Geneticist, Assistant Professor

September 2015 - Dr. Saranya Kittanakom-Arnoldo,
Clinical Biochemist, Assistant Professor

April 2016 - Dr. Jeff Fuller,
Clinical Microbiologist, Associate Professor



Congratulations to our Long Service Award recipients

2015 London Health Science Centre

35 Years
Dr. Robert Lannigan - Lab Medicine Program

30 Years
Dr. Bertha Garcia - Pathology Program
Dr. Mike Shkrum - Pathology Program

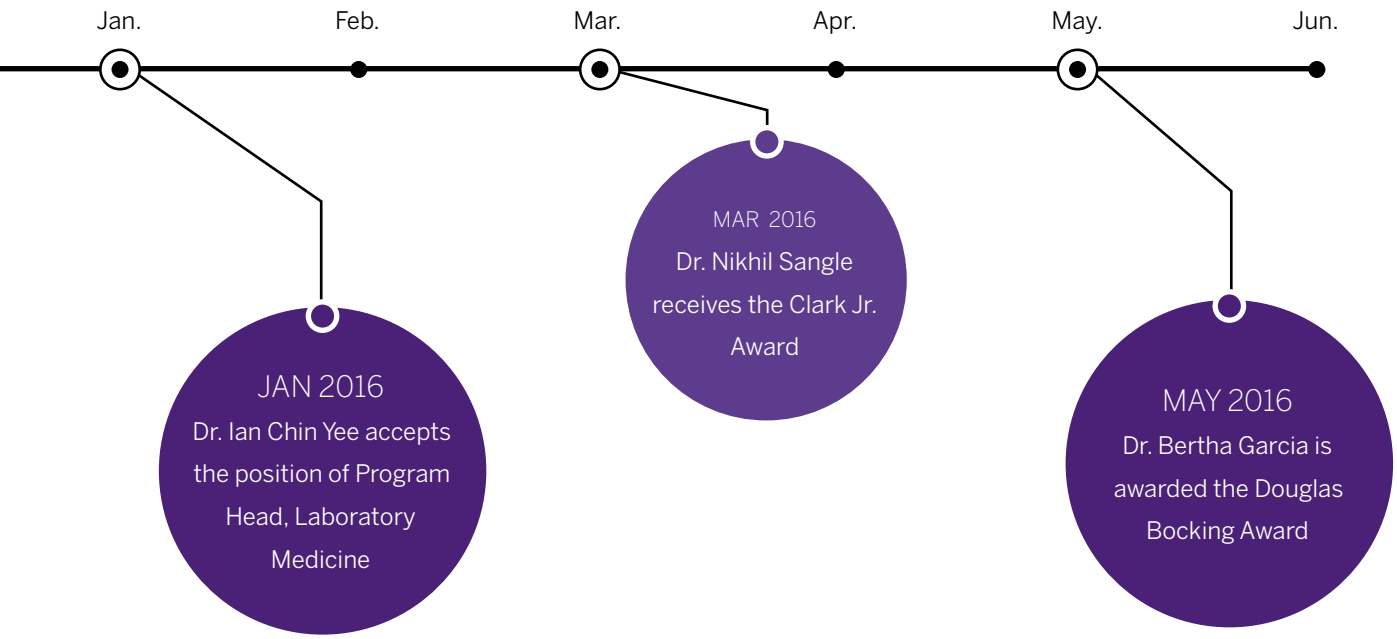
25 Years
Dr. David Ramsay - Pathology Program

20 Years
Dr. Robert Hammond - Pathology Program
Dr. Alan Tuck - Pathology Program

15 Years
Dr. Lee Cyn Ang - Pathology Program
Dr. Chris Armstrong - Pathology Program
Dr. Jessica Shepherd - Pathology Program

2016 Western University

25 Years
Dr. Madeleine Moussa
Dr. Kamilia Rizkalla
Dr. Carolyn McLean

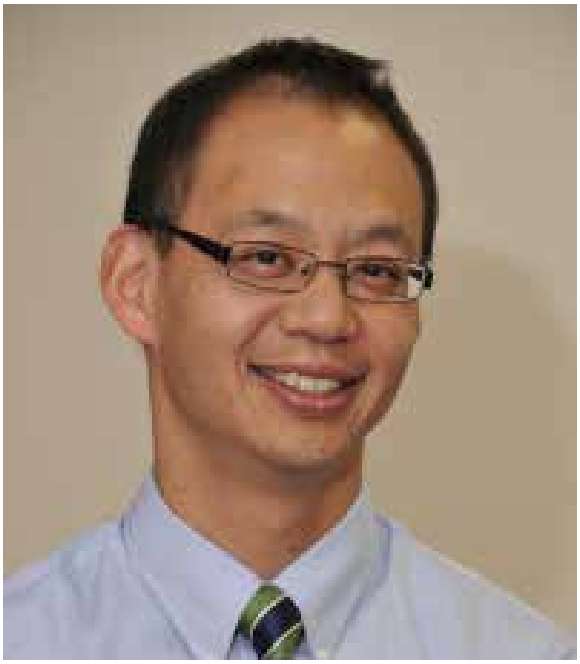


Drs. Moussa, Rizkalla and McLean

Leadership

September 2015 – Dr. Vipin Bhayana is appointed Division Head, Biochemistry & Immunology, and Core Labs and Point of Care Testing.

January 2016 - Dr. Ian Chin Yee accepts the position of Program Head, Laboratory Medicine



Dr. Ian Chin Yee

February 2016 – Dr. Bertha Garcia is reappointed as Vice Dean, Education, Schulich School of Medicine & Dentistry

Awards and Honours

December 2015 – Dr. Mark Darling is awarded the 2015 W.W. Wood Award for excellence in dental education.

Dr. Mark Darling recieves the W. W. Wood Award

March 2016 – Dr. Nikhil Sangle receives the Dr. L. Clarke Jr. and Elaine Stout Endowment Award at the United States and Canada Academy of Pathology (USCAP) meeting.

May 2016 – Dr. Bertha Garcia is awarded the Douglas Bocking Award, one of the highest teaching awards at the Schulich School of Medicine & Dentistry

May 2016 – Dr. Robert Hammond receives the Class of '42 Award at the Medical Convocation ceremony.

Dr. Robert Hammond receives the Class of '42 Award

Commitment to the Community

December 2015 – London Health Sciences Centre Pathologists and staff cooked dinner at Ronald McDonald House.

December 2015 – Pathology and Laboratory Medicine university administrative staff led a holiday Toy Drive and delivered a mountain of toys and gifts for mothers and children at Women's Community House.

March 2016 - Pathology and Laboratory Medicine university administrative staff collected prizes, put together gift baskets and coordinated a Spring Raffle which raised $2,000 for the London Food Bank.

In Memoriam

In April 2016 the department gathered to remember Dr. Colette Guiraudon, Professor Emerita, who passed away on March 23, 2016.

Dr. Colette Guiraudon, Emerita Professor

Our **LEADERSHIP**

SUBRATA CHAKRABARTI
Chair/Chief

Appointed Chair/Chief in 2011. He is respectively accountable to the University and the Hospitals.

DAVID DRIMAN
Director of Education

Appointed in 2011. The Director of Education oversees the educational activities in undergraduate, graduate and postgraduate education.

ZIA KHAN
Director of Research

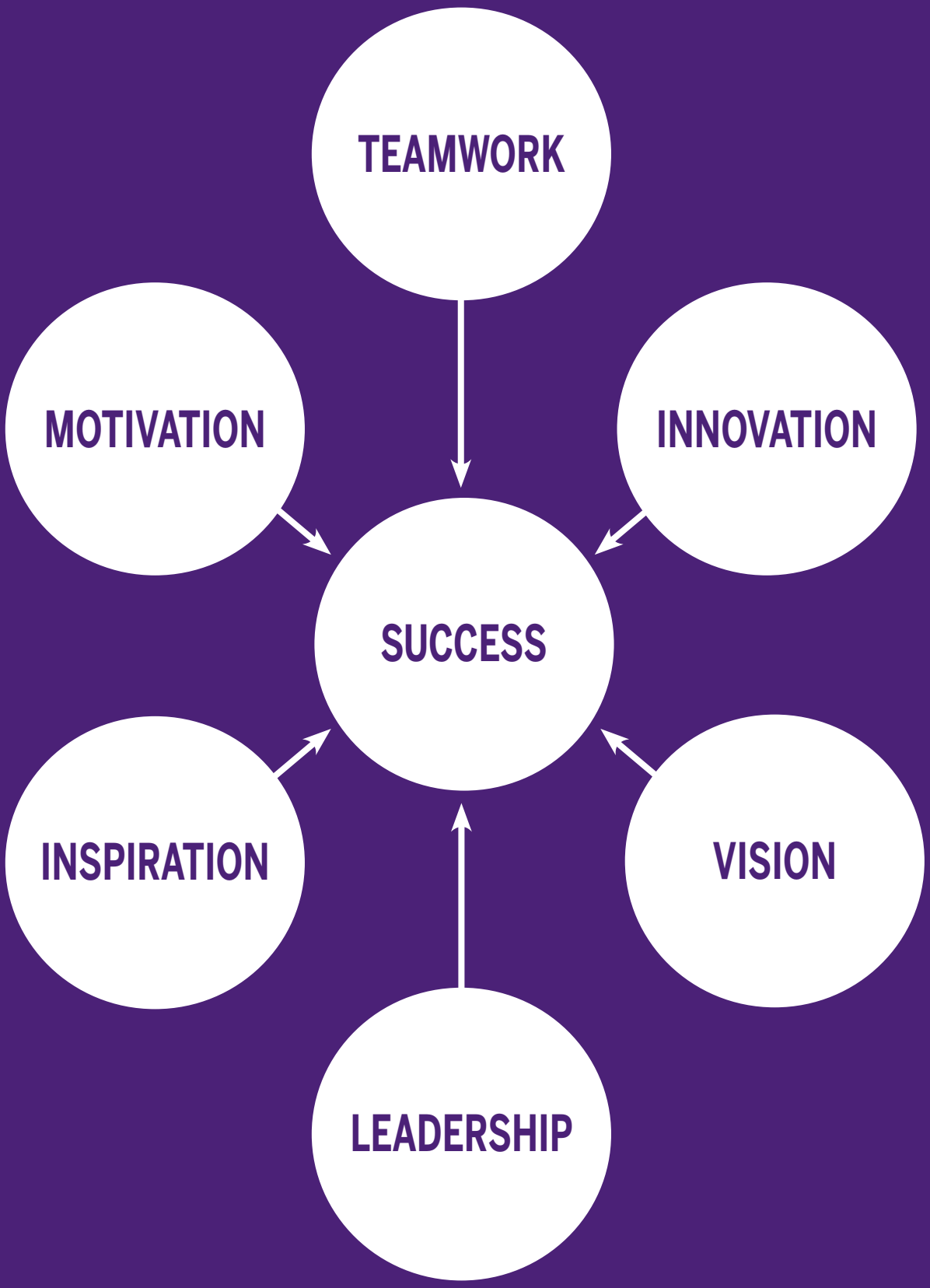
Appointed in 2011. The Director of Research develops research programs and facilities, and supports the recruitment and selection of new researchers.

IAN CHIN-YEE
Program Head Laboratory Medicine

Appointed in 2016. The Program Head, Laboratory Medicine oversees activities of Immunology & Biochemistry, Transplant Immunology, LHSC Pulmonary Function and Hematology.

MEG MCLACHLIN
Program Head Pathology

Appointed in 2011. The Program Head of Pathology oversees activities on Surgical Pathology, Cytology, Autopsy Services and Molecular Pathology.


TEAMWORK
MOTIVATION
INNOVATION
SUCCESS
INSPIRATION
VISION
LEADERSHIP

Academic **ORGANIZATION**

UNDERGRADUATE EDUCATION

UNDERGRADUATE BACHELOR OF MEDICAL SCIENCES

Zia Khan
Undergraduate Chair

UNDERGRADUATE MEDICINE

Ted Tweedie
Meds 1 & 2

Mariamma Joseph
Meds 3

Michele Weir
Meds 4

UNDERGRADUATE DENTISTRY

Mark Darling
Coordinator

GRADUATE EDUCATION

RESEARCH BASED GRADUATE PROGRAMS

Chandan Chakraborty
Graduate Chair

MASTERS OF CLINICAL SCIENCES PATHOLOGISTS' ASSISTANT PROGRAM

Nancy Chan
Program Director

Elena Tugaleva
Medical Director

POSTGRADUATE EDUCATION

ANATOMICAL PATHOLOGY RESIDENCY PROGRAM

Aaron Haig
Program Director

NEUROPATHOLOGY RESIDENCY PROGRAM

Lee Cyn Ang
Program Director outgoing

Rob Hammond
Program Director incoming

Faculty at the Dean's Gala

ADVANCED TRAINING

SURGICAL PATHOLOGY FELLOWSHIP PROGRAM

David Driman
Program Director

AREA OF FOCUSED COMPETENCE DIPLOMA PROGRAM IN CYTOPATHOLOGY

Michele Weir
Program Director

CONTINUING PROFESSIONAL DEVELOPMENT

CONTINUING PROFESSIONAL DEVELOPMENT

Joanna Walsh
Program Director

NOVEL EDUCATION RESOURCE DEVELOPMENT

Michele Weir
Coordinator

ADMINISTRATIVE SUPPORT

Mair Hughes
Manager, Administration & Finance

Mellonie Carnahan
Finance & HR Coordinator

Cheryl Campbell
Education Coordinator, Undergraduate & Postgraduate

Tracey Koning
Education Coordinator, Graduate Programs

Linda Jackson-boeters
Departmental Technician

Kathilyn Allewell
Media Specialist

Susan Underhill
Administrative Assistant

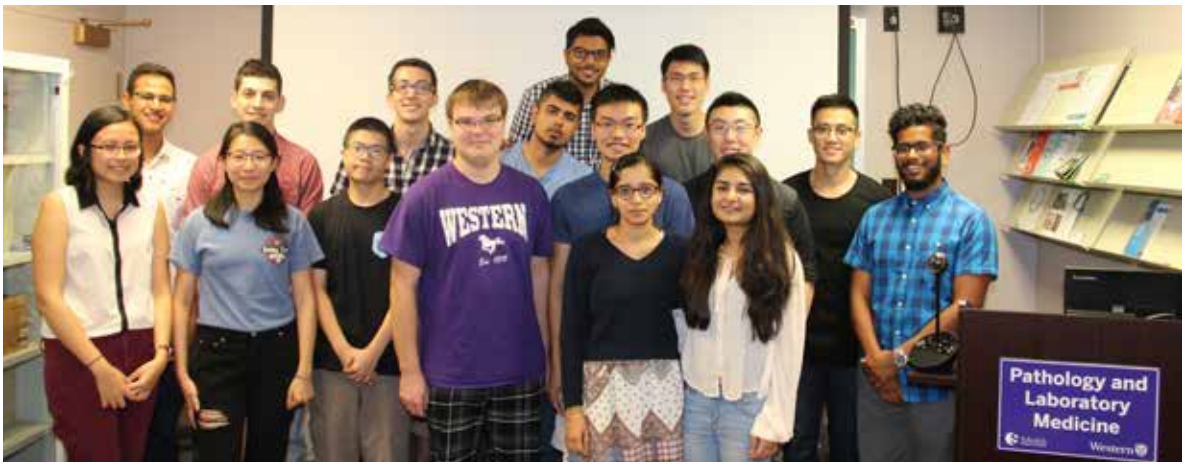
Administrative Staff

Education **PROGRAMS**

Message from the Director of Education

The educational "enterprise" within the department continues to perform and grow at a high level and across all facets of education. At the undergraduate level, our modules remain some of the most sought after in the Bachelor of Medical Sciences (BMSc) program and we have the highest entrance average among the BMSc modules. There has been a strong and successful push to elevate the visibility of Pathology and Laboratory Medicine to medical students early in the curriculum and to enhance student consideration of the specialty as a career choice. Faculty involved in teaching dentistry courses are planning on developing more online learning including the use of virtual microscopy. In the research-based undergraduate and graduate programs, most exciting has been the development of the new One Health program which, by virtue of its interdisciplinary structure, is expected to help break down faculty and departmental barriers across Western. The Pathologists' Assistants program remains highly sought after by applicants. The postgraduate (residency) and the advanced (post-residency) programs in surgical pathology and cytopathology are likewise sought after with students and residents from across the country. Western residents' continuing success at the Royal College examinations is a source of pride. The department continues to offer opportunities for continuing professional development to our community partners through a new series of multi-header microscope workshops. The Novel Education Resource Development group continues to provide those with particular interest in education, a community of practice for teaching activities, scholarship and leadership in education.

"Most exciting has been the development of the new One Health program which, by virtue of its interdisciplinary structure, is expected to help break down faculty and departmental barriers across Western."



BMSc 4th Year Undergraduates

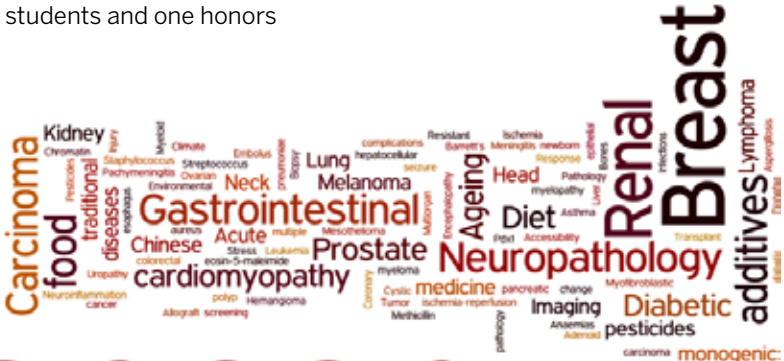
Undergraduate Education

Bachelor of Medical Sciences (BMSc)

A priority of our department is to ensure that we provide the best possible education to our undergraduate students. We offer several modules in the BMSc program:

- An Honors Specialization (thesis) and a Specialization (non-thesis) in Pathology
- A Major in Pathology is also offered and can be completed only in combination with another Major (double Majors) in a BMSc degree.
- The Department of Pathology and Laboratory Medicine also offers Honors Specialization modules jointly with the Department of Computer Science (Medical Health Informatics), the Department of Biochemistry (Biochemistry and Pathology of Human Disease), and the Department of Microbiology and Immunology (Microbiology and Immunology with Pathology)

This past year, we welcomed 10 Pathology honors specialization students and one honors student from our combined module with Biochemistry. These numbers are expected to rise as we have been able to increase the pool of research projects available for honors students. In addition, students in the combined module with Microbiology and Immunology, will enter their senior year in 2016. We are anticipating a total of 15-18 students in the Honors Specialization programs.



New initiatives

The Department of Pathology and Laboratory Medicine has built an interdisciplinary program in One Health from the ground up. One Health is a collaborative framework to address the intricate link between human health, wildlife diseases, and ecosystem platform. The most essential aspect of this program is to train students to think of all the factors that relate to human health. During the past year, we identified our wish-list of trainee competencies, courses and other resources offered at Western, and have come up with an impressive syllabus for undergraduate students. We have held meetings with various departments at Schulich Medicine & Dentistry, in the Faculty of Science, and in the Faculty of Social Science with the aim of creating a one-of-a-kind interfaculty education and research program. This undergraduate BMSc program is fully operational for September 2016.

Future Plans

As we look to the future, we have tremendous opportunities to grow our program and set precedent. As mentioned, we have been able to increase the number of research projects available to Honors Specialization students. We will continue to work with our faculty to facilitate their participation in the programs through creating collaborations within and outside of the department and identifying sources for funding for the student's research projects.

We are also in the position to set a precedent in undergraduate education through our program in One Health. This program breaks down faculty and School barriers and involves participation by members across Western University. This is the truly unique aspect of the program. We can envision that our One Health program will become a model for undergraduate education at Western.

Undergraduate Medicine Education

We want to elevate the visibility of Pathology and Laboratory Medicine to medical students early on and enhance student consideration of Pathology and Laboratory Medicine as a career choice. We also want to train our students to achieve certain pathology exit competencies that we believe a graduating medical student should learn and demonstrate by the end of fourth year in preparation for and transition to residency.

Meds I and Meds II

During the past year, our faculty actively participated in various Meds I and Meds II curriculum courses, which included pathology lectures, Patient-Centred Context Integration and Application, Clinical-Pathological Conference, portfolio teaching and small group discussions. Three pathologists served as course chairs in these courses. In addition, we offered individual one-to-one observership opportunities to a number of Meds I and Meds II students. Through the Pathology and Laboratory Medicine interest group, four activities were organized this past year in which students, in small and large groups, learned basic skills in the work-up of real case scenarios and observed and experienced the life of a pathologist in an academic hospital. This year, a guide was produced to assist the future students in organizing these sessions and one pathology resident was introduced as the resident contact.

Meds III and Meds IV

During the past year, our faculty actively participated in the Med III pathology case conference seminar series, as part of Surgery clerkship. In order to equip residents for successful pathology teaching, one pathology resident actively participated as an organizer and teacher. Following the seminar, students were given a short tour of the pathology lab. In addition, this year, students received a short hands-on demonstration of a "Fine Needle Aspiration Cytology" procedure and smear preparation from the cytology division. The addition of a camera to the current multi-head microscope, enhanced large group teaching opportunities for medical students.

We also offered the Meds III and IV Clinical Clerkship, Pathology Electives (two weeks) to a number of medical students as well as those from external universities. These electives were very well received by the students.

We were invited to participate in the Meds IV Integration and Transition (I&T) course module on dyspnea with Dr. Michele Weir as the module lead. This was a collaborative module with instruction from microbiology, pathology, otolaryngology and respirology which stimulated group work by the students around a case of the week. Topics covered included cause of dyspnea, pneumonia, head and neck masses, lung cancer, collection techniques and Fine Needle Aspiration Biopsy. As well, four faculty participated in the physicianship component of the I&T course by leading large group discussions from the laboratory perspective on Quality Assurance/ Patient Safety and Medical Bioethics.

Looking Ahead

Our department is fortunate to have a group of passionate teachers. Resident involvement in medical student teaching is very positive. We will continue the current educational activities and participate in future initiatives. We will continue involving more residents in undergraduate medical education teaching and mentoring.

Undergraduate and Postgraduate Dentistry

In the Schulich Dentistry curriculum, instruction in general and systemic pathology is introduced in the first year. Five full courses in pathology and oral pathology were offered to undergraduate and postgraduate dental students for 2015 -16.

The strengths in the pathology components of the dentistry curriculum and courses lie in the depth and breadth of the subject matter, and availability of instructors. There is control over the subject matter, though it is tailored to dovetail with the rest of the dentistry curriculum, and excellent cooperation among the instructors. The students are generally of high standard and intellect and there is great diversity among the trainees, providing opportunity to teach internationally trained dentists.

Future plans include investigating opportunities to develop online learning through the OWL online course management system, and use of virtual microscopy.
We would like to research Oral Pathology undergraduate education with a focus on increasing impact on students and securing funding for research.

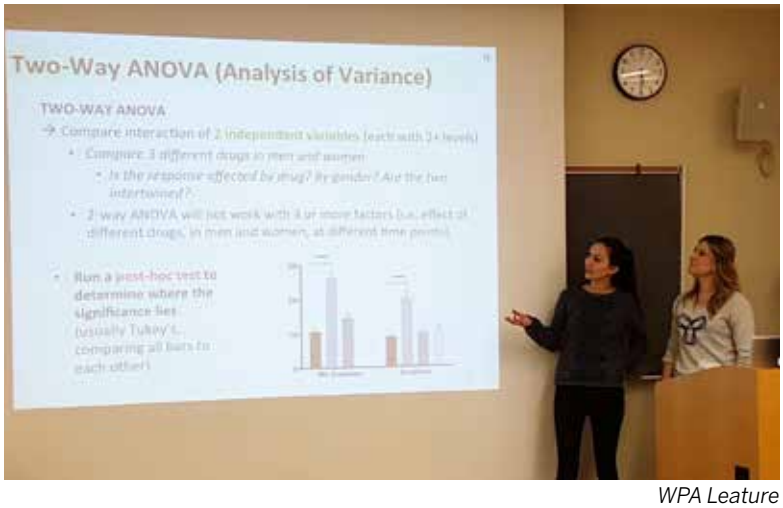
Dr. Keats Leature for the WPA

Graduate Education

The Graduate Program in Pathology and Laboratory Medicine is an integrated research program which offers full-time and part-time degrees of Master of Science and Doctor of Philosophy.

Investigation occurs at the molecular, cellular, tissue, whole organism, and clinical levels.

As part of the program, our graduate students carry out supervised research in various thematic areas including cancer, diabetes, transplantation, stem cell biology, neurodegenerative diseases, cardiovascular diseases, allergic disease, forensic pathology and motor vehicle trauma, microbial diseases, developmental defects, medical molecular cytogenetics and toxicology.



WPA Leature

Duennwald Lab participating in the 2016 ALS walk

The objective of our Graduate Program is to train tomorrow's researchers and scientists to make significant contributions to the global understanding of disease diagnosis and mechanisms. Graduates of the research-based program are qualified for a diverse set of careers including academia, government, and the pharmaceutical industry, many others have also gone to professional schools to become clinicians, dentists, other health professionals, lawyers, and business administrators in biotech companies.

A new interdisciplinary graduate program, "One Health", is being developed in the background of our preexisting focused research and study area within the Environmental Pathology theme of the Department of Pathology and Laboratory Medicine Graduate Program. The concept of One Health has evolved from the understanding that the health of humans, animals and the environment are interconnected. Future plans will include the integration of the novel interdisciplinary undergraduate One Health program with the graduate program in One Health.

Masters of Clinical Science (MCISc) Pathologists' Assistant Program

The MCISc Pathologists' Assistant Program welcomed six new students in September 2016. It continues to be a very successful and competitive program, with more then 100 applicants for six available seats. We had a large number of very

PA Students Graduating

impressive applicants, many with a demonstrated interest in this health care profession. Our six top ranked applicants all accepted our offers of admission. Special thanks to all those involved in reviewing the applications, interviews, and tours for the applicants/interviewees.

We congratulate Steffi Stephenson, Chelsea McLeod, Emily Almeida, Derek Kleinsteuber, Xusheng Zhang and Kyle Difazio on their upcoming graduation at the October 2016 convocation. The students have had great success in finding employment, including three who worked at London Health Sciences Centre on weekends prior to completing their rotations. Many students received multiple job offers.

Steffi Stephenson has been hired at London Health Sciences Centre and represented our program at the Canadian Association of Pathologists meeting in Vancouver in July 2016. Kyle Difazio and Chelsea McLeod will be student delegates at the American Association of Pathologists' Assistant annual meeting in San Diego in September. Julie Wallis received the Ontario Graduate Scholarship and Steffi Stephenson was awarded the Dr. Fredrick Winnet Luney Graduate Scholarship. Our annual research day prize winners were Derek Kleinsteuber and Xusheng Zhang.

Our Pathologists' Assistant Program has recently been granted provincial ministry funding. This has resulted in a significant decrease in tuition (particularly for domestic students) as well as eligibility for students for the Ontario Student Assistance Program (OSAP).

Postgraduate Education

Anatomical Pathology Resident Training Program

In 2015-16 there were ten residents in the Anatomical Pathology (AP) Program (PGY1-5). The PGY2-5 residents are primarily located at University Hospital, and only go off-site for frozen section coverage at other hospitals or to attend some academic events or rounds. Residents have the benefit of the Regional Forensic Unit also being on-site, as well as a parallel Neuropathology Program, and adjacent Schulich Medicine,

Graduating Residents

Residents at Multi-Headed Microscope

fostering additional exposures and opportunities. All the full-time Anatomical Pathologists participate in teaching and mentoring residents, serving on one or more subspecialty areas. Dr. Aaron Haig, Program Director cites the many strengths of the AP Program. Most pathology work is consolidated at one physical location, which allows for maximum exposure to cases and teaching. The residents are exposed to wide variety of cases due to the presence of a large regional cancer care centre and wide referral base. The program is fortunate to have a high faculty-to-resident ratio, a strong faculty commitment to resident education, and faculty mentoring of junior residents.

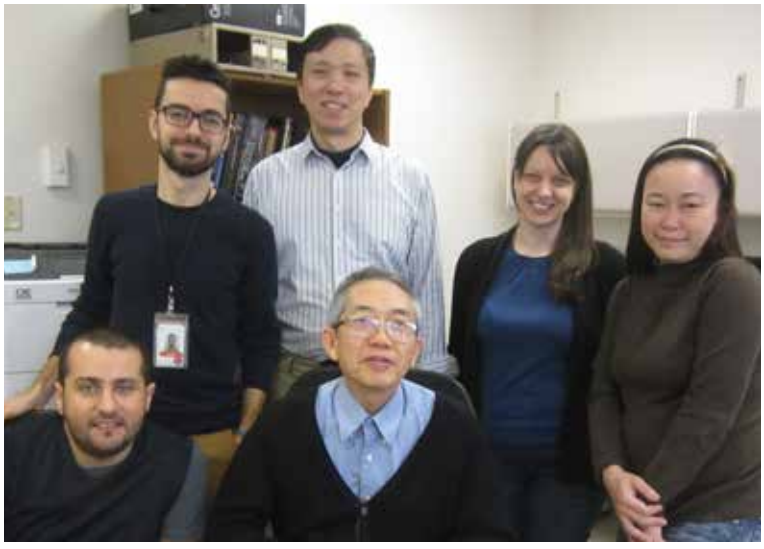
Lack of space continues to be a challenge and limits both expansion of the program and accepting off-service residents and medical students. Ongoing unpredictability of the job market for new pathologists is also a challenge, most positions are tied to hospitals whose budgets continue to be cut, despite the increasing workload and case complexity that pathologists are facing.

We are proud of our residents' continued success at the Royal College examinations (unbroken 26-year pass record) and in developing sound practice competence.

Future plans include implementation of competency-based medical education in collaboration with the Royal College. As well, we are preparing for our scheduled external review in 2017.

Neuropathology Resident Training Program

The program remains fully subscribed and our policy continues in accepting both Canadian and foreign medical graduates, including international sponsored residents. This policy reflects the shortage of Neuropathology posts in Canada for qualified Canadian neuropathologists and is in line with the internationalization initiatives of Western University



Neuropathology Pathology Residents

and the Schulich School of Medicine & Dentistry. The international sponsored residents are self-funded and will return to their sponsoring institutions at home after completion of training. We provide elective periods for residents from other training programs and we also offer post-residency fellowship training for Canadian, and self-funded international fellows.

The program accepted one PGY1 resident from the 2015 CaRMS match. There are also three internationally trained residents, sponsored by the Saudi Arabian government, in the program. The trainee body also includes two overseas clinical fellows. This core complement of trainees was supplemented in 2015-16 by eleven elective period residents from other Western Residency Training Programs (four from Neurology, four from Neurosurgery and three from Anatomical Pathology).

Three faculty Neuropathologists (Drs. Lee Cyn Ang, Robert Hammond and David Ramsay) are involved in the Program. The day-to-day training and education of the residents is greatly enhanced by the efforts of the senior Neuropathology residents and the clinical fellows. The training of the career Neuropathology residents is supplemented by a mandatory one- to three-month-long paediatric neuropathology posting to either the Vancouver Children's Hospital or the Toronto Hospital for Sick Children.

The program has been fully accredited by the Royal College of Physicians and Surgeons of Canada since 2012. The training is also accepted by the European Confederation of Neuropathological Societies for the qualification examination of the European Fellowship in Neuropathology (EFN). Dr. Kurdi, the PGY5 senior resident, and Dr. Sumit Das, who had previously graduated from our program, passed the 2016 Royal College Specialty examination. Dr. Kurdi also passed the EFN examination.

An important plan for the future is to implement the directive of the Royal College for competency-based resident education. This will entail substantial changes to the training objectives, teaching curriculum and methods of evaluation.

Given the continuing shortage of posts for in Canada for Canadian Neuropathologists, the viability of the Program will require continued recruitment of international residents and fellows who will return home after completion of training.
Dr. Ang, who has been the program director since July 2004, stepped down in July 2016 and Dr. Hammond is now the new program director. Ms. Cheryl Campbell, who has done an excellent job since 2014, continues as the program administrator.

Advanced Training

Surgical Pathology Fellowship Program

The surgical pathology fellowship program remains a sought-after program for residents coming out of training in Canada. There has been on average five times the number of applicants to available positions. There was one fellow in the Department in 2015-2016.

Dr. Allison Osmond spent five months in gastrointestinal and liver pathology, with the remaining time spent in skin and breast pathology.

Strengths of the program include the quality of teaching staff in department, volume of material available for learning, pleasant and agreeable learning environment and external recognition of Schulich Medicine & Dentistry as a desirable location for fellowship training in pathology.

Challenges lie in the on-going threat to funding sources. Continued stable funding for the surgical pathology fellowship program is important, ideally for two positions. This would allow the program to be more competitive with programs in the US and would further strengthen our position as one of the few and most desirable places in Canada to undertake fellowship training. The possibility of innovative funding sources and mechanisms are being considered.

Area of Focused Competence (Diploma) in Cytopathology

The team had a busy year training our second candidate, interviewing for our next candidate and preparing for the internal review of the program. The team is taking a well-needed break from training for 2016-17, but we did review applications for 2017-18 and secured our third trainee, from the University of Calgary.

We had the first in Canada internal review of our new AFC program in Cytopathology in January 2016 by two Schulich Medicine & Dentistry faculty and one resident. The review occurred over one day with face-to-face interviews of the team and some teleconference sessions to accommodate those team members unable to travel to our department. Six months later, we received the great news that our program has been fully accredited and we await the details of the review from the Royal College. Congratulations to our team for this success and a big thank you to all those who took time to participate in our internal review day.

As with any new curriculum, there have been minor changes to the training documents from the Royal College and we have updated our program accordingly. We also updated our Objectives and ITERs to include updated components from the CanMEDs 2015 version. Our program volunteered to pilot the new e-Logbook from the Royal College for our AFC program and participated in numerous teleconferences to help improve this new tool. The e-Logbook provides summaries of microscopic cases, fine needle aspiration biopsies and rapid on-site evaluations performed by the trainee and is submitted on-line as well as into the e-Portfolio for review by Royal College assessors. Dr. Pocrnich completed our program in June 2016 and has submitted her portfolio to the Royal College for assessment. We now await the Royal College's decision of her submitted materials and look forward to training our next candidate.

Continuing Professional Development

The Department of Pathology and Laboratory Medicine commenced a series of multi-header microscope workshops for community pathologists in January 2016. The first two workshops (GI and liver pathology, and GYN pathology) received an overwhelmingly positive response from participants.

Pathology and Laboratory Medicine Grand Rounds were held every other month with a variety of interesting local and external speakers. Previous problems with broadcasting via OTN have been resolved and attendees at distributed sites were able to listen in and view the presentations.

Grand Rounds

Date	Presenter	Title
September 2015	Blaise Clarke, MD, FRCPC Assistant Professor, Department of Laboratory Medicine & Pathobiology, University Health Network, Cancer Clinical Research Unit (CCRU), Princess Margaret Cancer Centre, Toronto	Identifying Lynch syndrome in patients with gynecologic cancers: implementation of reflex testing strategies and its implications
November 2015	Michael Silverman, MD, FRCPC, FACP, AAHIVMed, Assistant Professor Dept of Medicine, Chair/Chief of Infectious Diseases, Western University, Associate Scientist, Lawson Health Research Institute	Fecal microbial Transplantation, What does this cr*p have to do with me?
January 2016	Chris Howlett, MD, PhD, FRCPC, and Bekim Sadikovic, PhD, DABMGG (mol; cyto), FACMG, Pathology and Laboratory Medicine, University Hospital	Personalized oncology, cancer genetics and the expanding role of the pathology laboratory
April 2016	Sandrine deRibaupierre, MD, FRCSC, Clinical Neurological Sciences, Pediatric Neurosurgery, LHSC	Augmented and Virtual Reality: From teaching Neuroanatomy to training Surgeons

Novel Education Resource Development (NERDs)

The NERDs group is an educational interest group which provides resources and a community of practice for teaching activities, as well as scholarship and leadership in education for our department. The group educates and assists with building resources for novel learning techniques in instruction, design and assessment and scholarship in education for faculty and trainees.

During the past year we have been creating resources for enhancing faculty and trainee development of educational skills and building a community of practice for sharing successes, experiences and challenges in the form of on-line resources and open access discussion forums. The open forums allow for conversation about scholarship experiences and sharing our successes of innovation in instruction, design and assessment. Topics covered have included peer dialoguing, designing engaging learning environments and small group activities, scholarship in education, feedback in pathology resident education and competency based medical education in pathology residency. Plans for the upcoming year include open forums and continued building of the OWL website.

NERDs Open Forums

Date	Presenter	Title
August 2015	Mark Weyers, MSc, Doctor of Education Education Developer, Continuing Professional Development, Schulich School of Medicine & Dentistry, Western University	Designing Engaging Learning Environments and Small Group Activities
October 2015	Drs. A. Osmond, W. Stecho, A. Haig & M. Weir Department of Pathology and Laboratory Medicine, Schulich School of Medicine & Dentistry, Western University	Addressing the Competency Based Medical Education Design Dilemma in a Small Pathology Residency Training Program
November 2015	Mark Weyers, MSc, Doctor of Education Education Developer, Continuing Professional Development, Schulich School of Medicine & Dentistry, Western University	Small Group Discussion Techniques (part 2)
January 2016	Dr. David Driman, MBChB, FRCPC Director of Education, Department of Pathology and Laboratory Medicine, Western University	Thoughts about Feedback in Residency Training
April 2016	Lisa Faden, PhD, MEd, BA Research Specialist and Education Coordinator, CERI, Western University	Scholarship in Education

Research REPORT

Research overview

Achieving excellence in research is central to the mission of our department. Research in our department is particularly strong in a number of subareas, all of which are in perfect alignment with Areas of Excellence at Schulich Medicine & Dentistry. In fact, we have a strong presence in at least six out of seven areas of excellence. These subareas are highlighted in our research publications included in this report and include: cancer biology, cardiovascular, respiratory health, and metabolic diseases, infection and immunity, musculoskeletal health, maternal, fetal, child and family health, and neuroscience and mental health. In addition, over the past few years, we have seen diversification of our research expertise through new appointments and recruitments. In response to this evolving landscape of our research, and to recruit students with appropriate background, we established an interdisciplinary undergraduate program in One Health.

Dr. Robert Zhong Seminar Series

We are approaching ten years now of holding the Dr. Robert (Zheng) Zhong Seminar Series. The purpose of this seminar series is to capture and showcase the research interests of our department and the wider university and hospital community. We have continued to invite excellent scientists from our department, as well as others at Schulich Medicine & Dentistry and Western University to enhance our research profile and to help establish collaborations. The seminars are accredited by the Royal College, Maintenance of Certification program. Attendance at the seminar series is at the maximum with almost all of our trainees, staff, and faculty participating. We also live webcast the seminars to allow our members at sites other than University Hospital to participate.

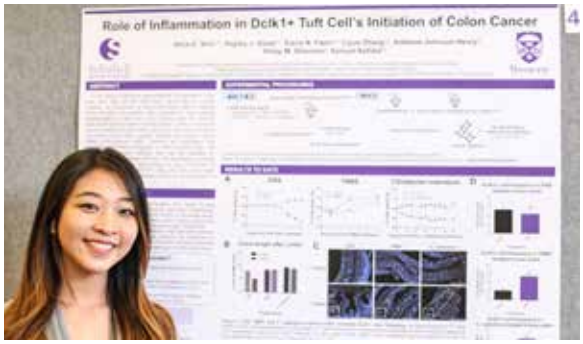
2016 Research Day Group Photo

Pathology and Laboratory Medicine

Research Day

During the past few years, our research day has been completely transformed. One of the major changes was including our fourth year thesis students, Pathologists' Assistant graduate program students, and students from the combined Oral and Maxillofacial Surgery MD/MSc program. In addition, we have continued to invite high-profile speakers to deliver the keynote address, which is now called the Paterson Lecture. These two changes have already produced the desired outcome: enhancing attendance/participation and increasing our research profile. Last year, we were fortunate to have Dr. Andrew Fire deliver the Paterson Lecture at our research day. Dr. Fire is the Professor of Pathology and Genetics at Stanford University School of Medicine. Among many awards for his pioneering work, Dr. Fire shared the 2006 Nobel Prize in Physiology or Medicine with Craig Mello "for their discovery of RNA interference - gene silencing by double-stranded RNA." At this event, we recorded the highest number of abstracts submitted (62) by our trainees as well as the highest attendance with over 300 participants. This is a great achievement for our department and we need to ensure that we maintain this high level.

Niamh Richmond presenting at Research Day



Alice Shin with her poster at Research Day

BMSc 4th Year Undergraduates

Research Day Winners

Challenges and future plans

Like most departments in academic institutions in Canada, we are facing challenges related to limited research funding. We have seen a significant shift by the funders towards research that demonstrates direct economic impact through commercialization and knowledge translation. To increase our share of competition-based external research funding, we are taking a number of steps. There has been an increased emphasis on inter- and intra-departmental research collaborations. This goal was a key point of discussion during our most recent Strategic Plan retreat. Achieving this goal involves activities spanning a wide spectrum from basic scientists and clinicians working together on student advisory committees, graduate student supervision, developing new collaborative research projects for our undergraduate students, and establishing collaborations with investigators outside of our department. We have also taken steps to be more visible through inviting high profile speakers at our Annual Pathology and Laboratory Medicine Research Day, Dr. Robert Zhong Seminars, increased presence at local research days, and by sharing our successes on our departmental website. The department is developing guidelines for protected time for our clinical faculty to undertake research activities. Some of these steps have already produced results. A few steps are slow processes and will likely take some time before the benefits are realized.

Another challenge our researchers are facing is inadequate space and dated infrastructure. This challenge will continue to be raised in our Annual Reports and Departmental meeting discussions. We are active each time a space and equipment upgrade opportunity knocks and we will continue to do so.

RESEARCH FUNDING STATISTICS

EXTERNALLY FUNDED (PI)

$1,700,000

INTERNALLY FUNDED (PI)

$700,000

EXTERNALLY FUNDED (CO-PI/CO-INVESTIGATOR)

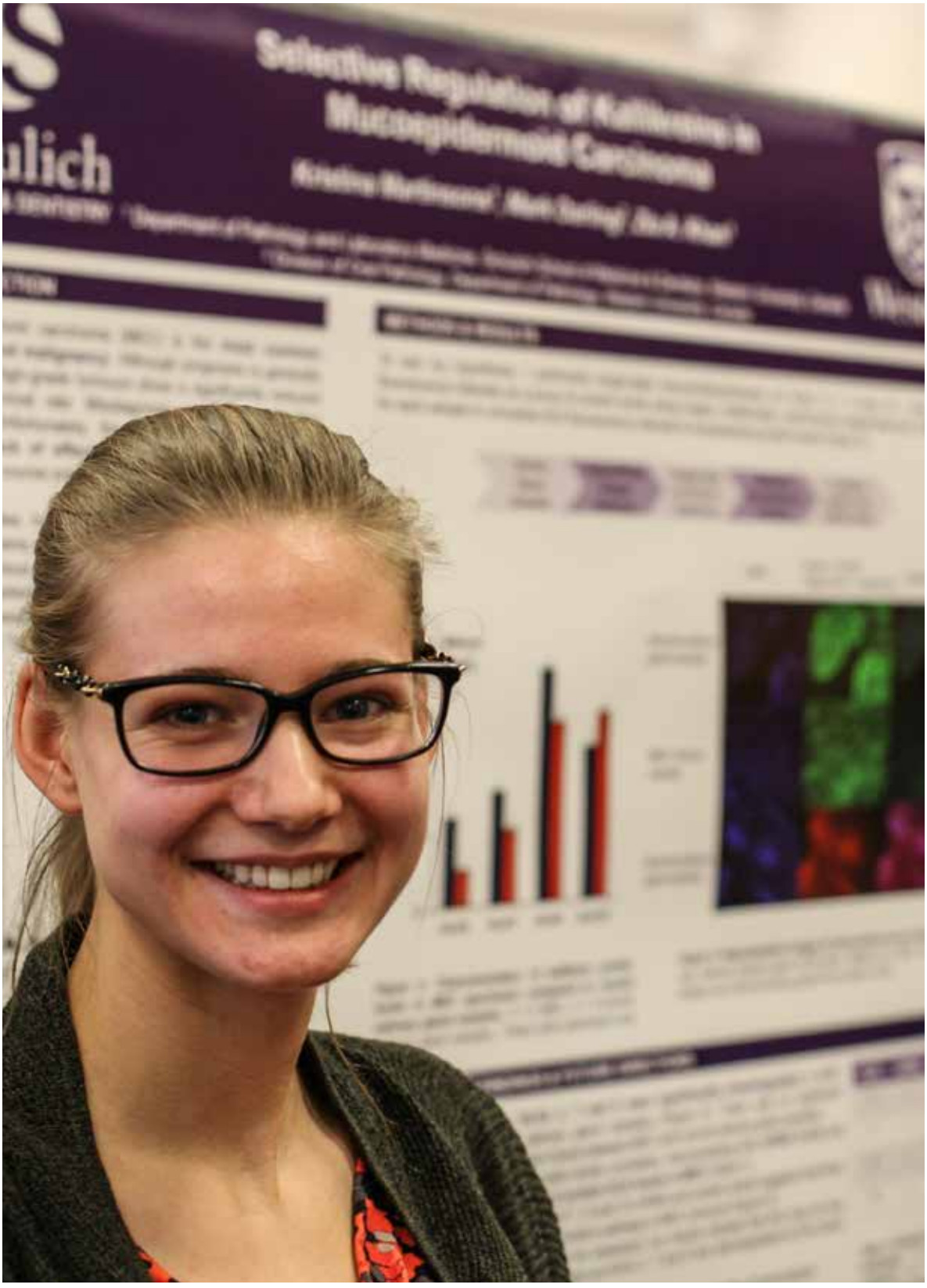
$2,400,000

INTERNALLY FUNDED (CO-PI/CO-INVESTIGATOR)

$275,000

TOTAL GRANT FUNDING HELD

$5,100,000



Kristina Martinsons with her poster at Research Day

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Research **SPOTLIGHT**

Dr. Mike Shkrum joined the Department of Pathology at Victoria Hospital (South Street) in 1985 after completing a forensic pathology fellowship at the Office of the Chief Medical Examiner in Chapel Hill, North Carolina. Dr. Shkrum is the Division Leader of the Autopsy Service and Director of the Regional Forensic Pathology Unit at London Health Sciences Centre (LHSC - University Hospital).

Dr. Mike Shkrum

Throughout his professional career, Dr. Shkrum has been interested in understanding how physical injuries occur. Determination of mechanisms of injury from postmortem examinations is important in not only assisting coroners and police in their death investigations but also developing countermeasures which can prevent deaths from accidents.

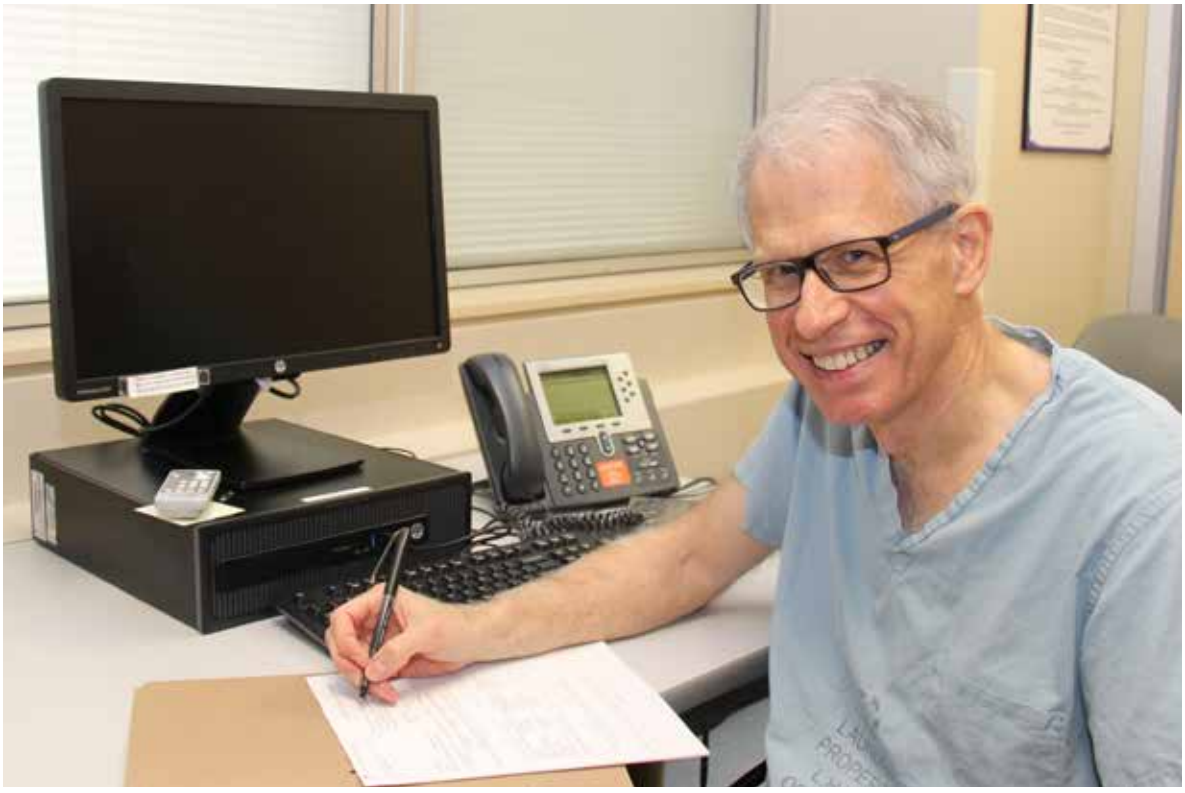
Dr. Shkrum's research focus began in 1989 when he became a medical consultant on the Multi-Disciplinary Accident Research Team (MDART), based in the Faculty of Engineering at Western University. He published on injury mechanisms causing skull and cervical spine fractures, and vascular trauma (aorta, azygos vein) occurring in individuals who died in motor vehicle collisions. In 2002, Dr. Shkrum and his collaborators published a two-part study on deaths in Canada from deployment of first-generation airbags.

In 2011, MDART moved to the Faculty of Medicine and Dentistry and was renamed the Motor Vehicle Safety (MOVES) Research team. Dr. Shkrum is currently the Director and Principal Investigator

of the team. The MOVES Research team is one of six Canadian teams which investigate motor vehicle collisions for Transport Canada to help its ongoing efforts in protecting the safety of Canadian motorists through enforcement of federal motor vehicle safety standards. Real-world data, collected and analyzed by team investigators and consultants, assist Transport Canada in reconstruction of collisions by simulated crash testing.

Dr. Shkrum has involved undergraduate and graduate students in his motor vehicle collision-related research. With the support of the Office of the Chief Coroner for Ontario, students in the BMSc program (Pathology Honors Specialization) have studied lower extremity injuries in pedestrians struck by vehicles and injury patterns in drivers whose third-generation airbags deployed in motor vehicle collisions. Master's (MSc) graduate students have successfully completed theses on head and cervical spine injuries in paediatric motor vehicle occupants and on the causes of fatal motor vehicle collisions in urban and rural Canada.

Dr. Shkrum is excited about his current research. His new MSc candidate will be analyzing the data from a prospective study, conducted in liaison with the London Health Sciences Centre Trauma program, on paediatric rear occupants injured in motor vehicle crashes.



Dr. Shkrum filling out paper work

Clinical SERVICE

The Department of Pathology and Laboratory Medicine is a joint venture of London Health Sciences Centre (LHSC) and St. Joseph's Health Care London (St. Joseph's), created in September 2000. The Programs of Pathology and Laboratory Medicine provide a comprehensive range of routine and specialized laboratory testing and clinical consultation to support diagnosis and monitor treatment of patients within London, Southwestern Ontario, nationally and internationally.

Program of Pathology

The Program of Pathology includes the Divisions of Surgical Pathology, Cytopathology, Autopsy, Molecular Diagnostics, and Microbiology. The tissue-based services of surgical pathology, cytopathology and autopsy are provided at University Hospital, and microbiology and molecular diagnostics are situated at Victoria Hospital. Providing services across three hospital sites (UH, VH, St. Joseph's) requires daily off site coverage by both professional and technical staff as well as a regular and reliable transportation system. Pathologists are available at all three sites for intraoperative consultations that are critical for surgeons to make decisions while operating

Surgical Pathology

The volume of surgical pathology specimens submitted to the Department has steadily increased during the past five years. This increase has occurred most notably in GI specimens. Increasing complexity of reporting requirements and ancillary testing methods have added to per case workload.

Since 2014, the Department has been able to measure turnaround times from specimen collection to report completion. This data is able to show a breakdown of turnaround times for

Cutting sections on Microtome

Grossing Tissues

each step in the laboratory process. It can thus demonstrate fluctuations in turn around time for all laboratory areas on a monthly basis. Daily staff huddles in all areas of the laboratory, with daily metrics, has allowed us to quickly identify bottlenecks and reassign staff appropriately.

Permission and funding have been approved for the mTuitive synoptic reporting system. This will allow pathologists to efficiently and accurately complete synoptic reports on cancer cases and will allow us to meet the Cancer Care Ontario standard of 90 percent complete reports. We will be participating in the Quality Management Partnership, a new province, wide pathology quality initiative.

In recent years, the reporting of pathology specimens has extended to molecular/ predictive markers for many cancer types. The department has implemented integrated testing for many of these markers. This has required the development of detailed work flow to ensure that the appropriate tissues and reports are created in partnership with the molecular diagnostics division. Undoubtedly, the divisions of surgical pathology and molecular diagnostics will continue to work closely in future to align diagnostic processes to support personalized medicine.

Cytology Staff

Cytopathology

The Cytopathology laboratory is committed to providing high quality and timely diagnostic services to patients in London and the region through the delivery of expert cytology consultation service to regional pathologists. During the past two years, we have strengthened our community partnerships and expanded our service commitment to a number of external clients in Southwestern Ontario (currently serving Stratford, Chatham, St. Thomas, Woodstock, Tillsonburg and Strathroy). This service focuses on non-gynecologic cytology and we no longer provide community gynecologic cytology through the Reese laboratory. The strength of our lab lies in its continued efficiency in providing quality results with clinically appropriate turnaround times. We have a robust ongoing technical and professional quality management program in place. We believe in continuous quality improvement (QI) and a number of ongoing in-house QI audits (urine, EUS FNA, Biliary brush) are in place to improve service and provide precise diagnosis. We believe in strong inter-professional and intra-professional collaboration to improve patient care and enhance relationship between teams. We had a positive Institute for Quality Management in Healthcare, Ontario Laboratory Accreditation visit in 2015. In collaboration with Mount Sinai Hospital, Toronto, in 2015, we delivered a successful Cytopathology CME event in London for provincial pathologists and technologists.

The cytotechnologists continue to provide an efficient and highly valued Rapid Onsite Evaluation (ROSE) FNA service at three sites in London to clinicians (1,183 cases in 2015). This past year, we have seen further expansion of advanced techniques such as EUS and EBUS procedures and our cytology team has been invited to provide educational sessions for clinicians and pathologists in our region and beyond. Our current model of cytotechnologists participating in renal biopsy service has been faced with a few challenges and technical leaders are working on solutions. Our plans to introduce a number of molecular tests related to cancer therapy on small cytology samples is progressing well and our validation process for EGFR testing is complete. The project for P16 validation is in progress.

Our future goal is to maintain excellence in all aspects of cytopathology. We strive to sustain a supportive environment for medical and technical staff to grow in their chosen fields. We are pleased with our progress and accomplishments during the past year.

Autopsy

The autopsy service based at University Hospital performs a dual role. By doing autopsies authorized by families of individuals dying in hospital, it monitors quality assurance of the London Health Sciences Centre clinical services. As a regional forensic pathology unit, the service assists coroners conducting death investigations in Southwestern Ontario.

In 2015, the total number of autopsies (hospital consent and coroner's warrant) increased 5.6 percent (from 603 to 637). There was a 0.8 percent decrease in coroners' cases (474 to 470) but a 29 percent increase in hospital consent autopsies (129 to 167). The proportion of coroners' cases originating outside of London done in the LHSC facility was 42 percent which was the same as 2014. Although current staffing by pathologists and support staff is sufficient to meet this regional need, this will be a concern if community hospitals in the region continue to close their autopsy services.

Autopsy Staff

Laboratory Testing

Molecular Diagnostics

Molecular Diagnostics is comprised of Biochemical Genetics, Cytogenetics and Molecular Genetic Sections and provides specialized genetic testing including inherited metabolic disorders, chromosome analysis/karyotyping, Fluorescence in situ hybridization, microarray analysis and a wide variety of individual gene and gene panel tests for inherited disorders, predictive cancer testing and therapeutic monitoring. All sections in the division also serve as reference laboratories for multiple tests at the provincial level and perform some testing nationally. The volume of specimens submitted to the division continues to increase, as does the complexity of the tests. For example, genomic microarray testing increased 218 percent from 2014 to 2015.

Molecular testing for many inherited diseases and cancers is advancing to use technologies that interrogate genomes or multiple genes simultaneously. In the past year, mitochondrial genome sequencing, expansion of several gene panels for a variety of hereditary disorders (such as breast and colon cancer and lysosomal storage diseases) and the validation of other assays (such as QF-PCR) for rapid prenatal detection of common aneuploidies have been introduced and implemented. Transfer of DNA sequencing from Sanger sequencing to Next Generation Sequencing (NGS) platforms has significantly increased the throughput of DNA sequencing and reduced test TATs. TATs for chromosome analyses have also been reduced through the use of an automated metaphase chromosome finder. The major goals of the division are to increase our depth of professional and technical coverage and to continue to acquire and develop new technology (such as additional automation and NGS capability) to meet current demands, advance our test menus and participate in future opportunities.

Microbiology

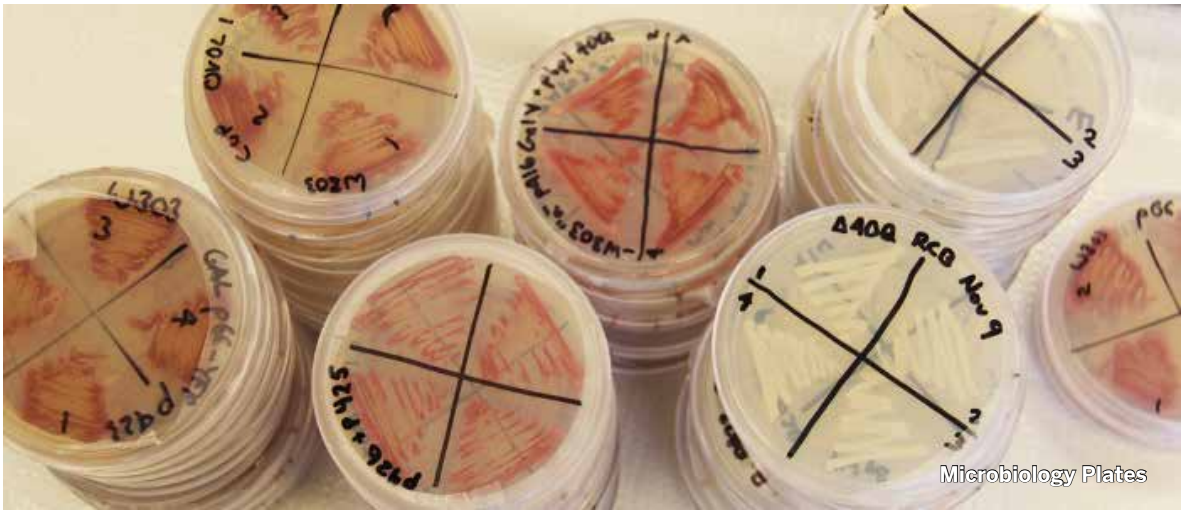
The Division of microbiology provides testing for the detection and treatment of infectious diseases. These services cover the areas of bacteriology, virology, mycology, molecular diagnostics, serology, and parasitology and includes the provision of clinical consultations, ongoing test development and quality enhancement, research, and education.

The bacteriology service provides for the identification and antibiotic susceptibility of bacterial agents associated with a wide range of infections. The molecular and virology laboratory areas offer a broad range of quantitative and qualitative molecular and serologic tests for the detection of respiratory viruses, blood-borne viral infections, transplantation-associated viral infections, and for the Trillium Gift of Life organ donation screening program. The microbiology division also provides support to hospital antimicrobial stewardship and infection prevention and control programs.

A recently published study by Dr. Delport, on the impact of rapid identification of bacteria from blood cultures has demonstrated improved patient outcomes and decreased length of stay. Similarly a study by pharmacy on the impact of the new galactomanin screening protocol introduced for high risk haematology patients has shown decreased utilization of healthcare resources and improved outcomes.

Dr. Jeff Fuller joined the division in April of 2016. He has been practising as a Clinical Microbiologist for more then 10 years with a broad focus on antimicrobial resistance detection and surveillance, rapid microbial identification systems, and invasive fungal infections. In addition, he coordinates a national surveillance program for antifungal resistance development in invasive isolates of Candida and respiratory tract isolates of Aspergillus in Canadian hospitals.

Dr. Aaron Campigotto joined the division in July 2016. His interests lie in molecular microbiology, including the development and optimization of molecular testing methods and evaluating their impact on patient care, and in laboratory quality improvement initiatives aimed at providing safer patient care.



Microbiology Plates

Program of Laboratory Medicine

The Program of Laboratory Medicine consists of five divisions: Core Laboratory and Point-of-Care Testing, Specialty Biochemistry, Investigational Hematology, Blood Transfusion and Transplant Immunology.

There have been a number of changes in Laboratory Medicine with a focus on program renewal and process improvement this year. In 2016, Dr. Ian H. Chin-Yee assumed the leadership as Program Leader of Laboratory Medicine. We have established a task force of laboratory specialists to work with clinicians to improve the electronic ordering practices of various hospital services.

Laboratory Medicine recognizes the challenges facing laboratories with increasing annual test volumes, cost constraints and human resource challenges. One of the strengths of the hospital laboratories has always been the expertise of its experienced technologists, many of whom are reaching imminent retirement. Transition of this knowledge from the specialty areas to the laboratory in general will be critical for future success. As such, the traditional divisions between specialty biochemistry, core and investigational Hematology are being revisited. Our goal is to create more lateral integration between the specialty areas and core as more of the subspecialty area tests are being moved to the Rapid Response Core Laboratory or Point of Care sites to provide accurate, cost effective patient-centered care.

Core Laboratory

The Core Laboratory encompasses general Chemistry and Hematology laboratory services as well as clinical consultation to Southwestern Ontario. There are three Core Laboratories across the city of London: Victoria Hospital, University

Core Laboratory

Hospital and St. Joseph's Health Care that provide initial, rapid, high-volume testing and screening for all the hospital service areas (including Parkwood and Regional Mental Health) and work in partnership with the other laboratories to provide complete investigational results. Each year, approximately 6.9 million chemistry tests, 490,000 CBC's and 210,000 coagulation tests are done in the Core Laboratories.

In March 2016, Pathology and Laboratory Medicine was approved to proceed to a Request For Proposals (RFP) for new Core Laboratory equipment. This RFP represents an exciting new phase in Laboratory Medicine providing us with the opportunity to redesign and modernize our laboratory system focused on improved diagnostic efficiencies and patient safety. The scope of this transformation will include all chemistry, immunochemistry, hematology and coagulation testing along with the goal of total laboratory automation. A holistic and collaborative approach will allow us to work with vendors at designing, selecting and carefully implementing the best fit technology for our laboratories city-wide.

In addition to laboratory transformation efforts, the Core Laboratory is focused on reducing unnecessary testing and the cost associated with tests that are being sent out to the outside laboratories for testing. For example, a high-volume test such as renal marker Cystatin C that was sent to in-common laboratory is now being done in the core laboratory at a much lower cost. We have also refocused our efforts on current "routine" laboratory testing, monitoring test utilization and educating ordering providers on appropriate laboratory practices guided by the "Choosing Wisely" principles. New automated systems for digitalization of slide images and remote interpretation are now available and will be part of the new systems moving forward. This will also potentially allow us to support regional laboratories that face similar challenges in peripheral blood and bone marrow morphology.

Point-of-Care Testing (POCT)

Point-of-Care Testing (POCT) is simply miniaturization of laboratory testing performed in the clinical setting by non-laboratory healthcare professionals. At LHSC/St. Joseph's, POCT includes capillary blood glucose, blood gases and metabolites, dipstick urinalysis, HbA1C, activated clotting time and fecal occult blood testing.

Specialty Biochemistry

Toxicology, Therapeutic Drug Monitoring and Special Chemistry Laboratory

This laboratory performs toxicology, therapeutic drug monitoring, vitamins, and various special chemistry tests for LHSC, St. Joseph's and other hospitals across the province and nationally. All drug tests previously done on the old single quadrupole LCMS and the UV-HPLC have been transferred and re-validated on the second new triple quadrupole LCMS, and the single quadrupole LCMS has been decommissioned.

Endocrinology and Maternal Serum Screening

The Endocrinology and Maternal Serum Screening Laboratory offers a large menu of tests for hormones and tumour markers. Sophisticated automated analyzers, as well as traditional manual radioimmunoassay techniques, are used to efficiently measure very low concentrations of some of these small to mid-size peptide hormones and markers. Ultra-Performance Liquid Chromatography (UPLC) methods are also used. The Maternal Serum Screening laboratory utilizes clinical data, ultrasound data and analytical data from the laboratory in order to generate a final report with the overall risk for Down Syndrome in the pregnancy. Programs in Maternal Serum Screening to move to enhanced FTS has been put on hold, however the impact of Non-Invasive Prenatal Testing (NIPT) for Down Syndrome screening from genetics laboratories is being felt across the province. This has made an impact on the number of specimens received for Integrated Prenatal Screening (IPS) and First Trimester Screening (FTS) in the MSS laboratory. Health care providers are seeking a screening result earlier in the pregnancy so that they can send the patient for NIPT before any diagnostic amniocentesis. Later this year, the Ministry of Health and Long-Term Care is expected to dictate major changes that will have to be made to the province wide prenatal Down Syndrome and Trisomy 18 screening programs.

Immunology

The Immunology Laboratory offers specialized comprehensive allergy testing for more than 200 allergens, auto-antibody testing for autoimmune diseases, quantification of various serum proteins and serum and urine protein electrophoresis. This laboratory has recently acquired a new instrument, Optilite to replace the Beckman Image for serum protein analysis.

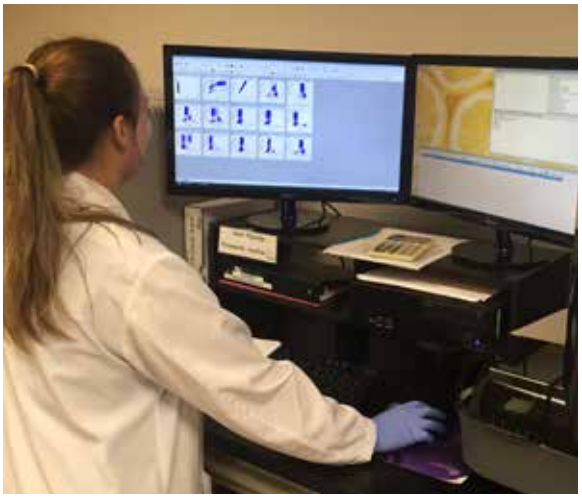
Trace Elements

Trace Element Laboratory offers a wide range of trace elements analysis for nutritional and toxic elements of clinical interest in Canada. Testing is used to assess deficiencies, measure nutrient intake, monitor toxic exposure through environmental or occupational exposure and provide trace metal analysis for patients with implants. This laboratory uses one of the most advanced and highly sensitive technology - High Resolution Sector Field Inductively Coupled Plasma Mass Spectrometry (HR-SF-ICP-MS).

Investigational Hematology Laboratory

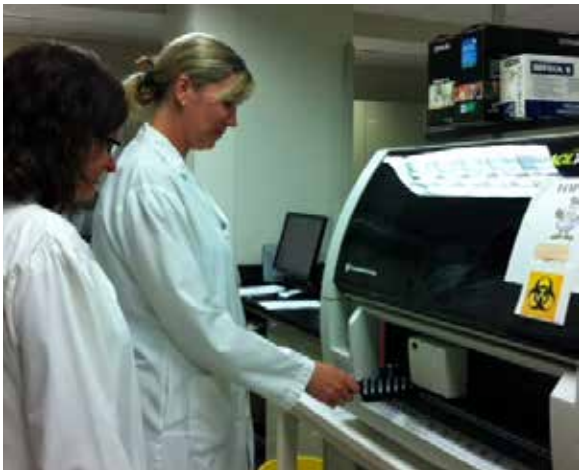
Flow Cytometry continues its long-standing success in innovation, both nationally and internationally. It specializes in detecting rare events, such as circulating tumour cells, small paroxysmal nocturnal hemoglobinuria (PNH) populations and minimal residual disease in childhood leukemia.

The Flow Cytometry Laboratory is the only Canadian centre participating in the NIH Study looking to standardize minimal residual disease detection in acute leukemia. This test has now been approved for provincial funding, but performance of this test remains a challenge in many laboratories. Recent research initiatives are aimed at streamlining the approach to testing for leukemia and lymphoma.



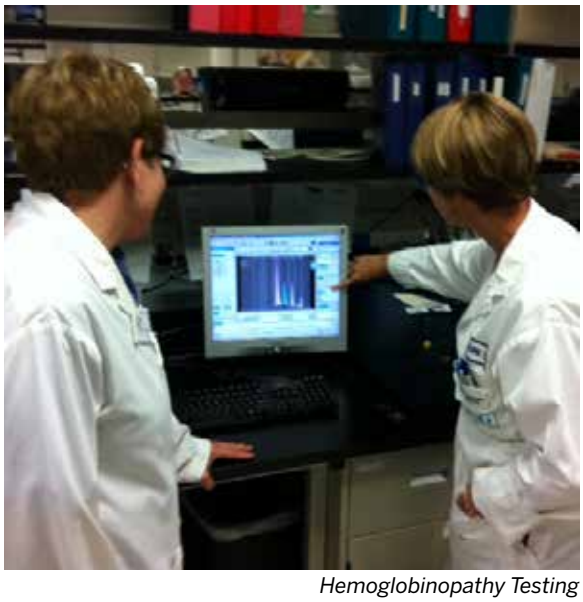
Flow Cytometry Laboratory

Our hemostasis and thrombosis laboratory supports one of the largest regional bleeding disorders programs in Ontario, providing specialty testing for patients with hemophilia and other bleeding disorders. Last year saw the implementation success of ADAMTS13 testing for patients with suspected thrombotic thrombocytopenic purpura (TTP) and hemolytic uremic syndrome. We also developed the first national quality assurance program for this test.



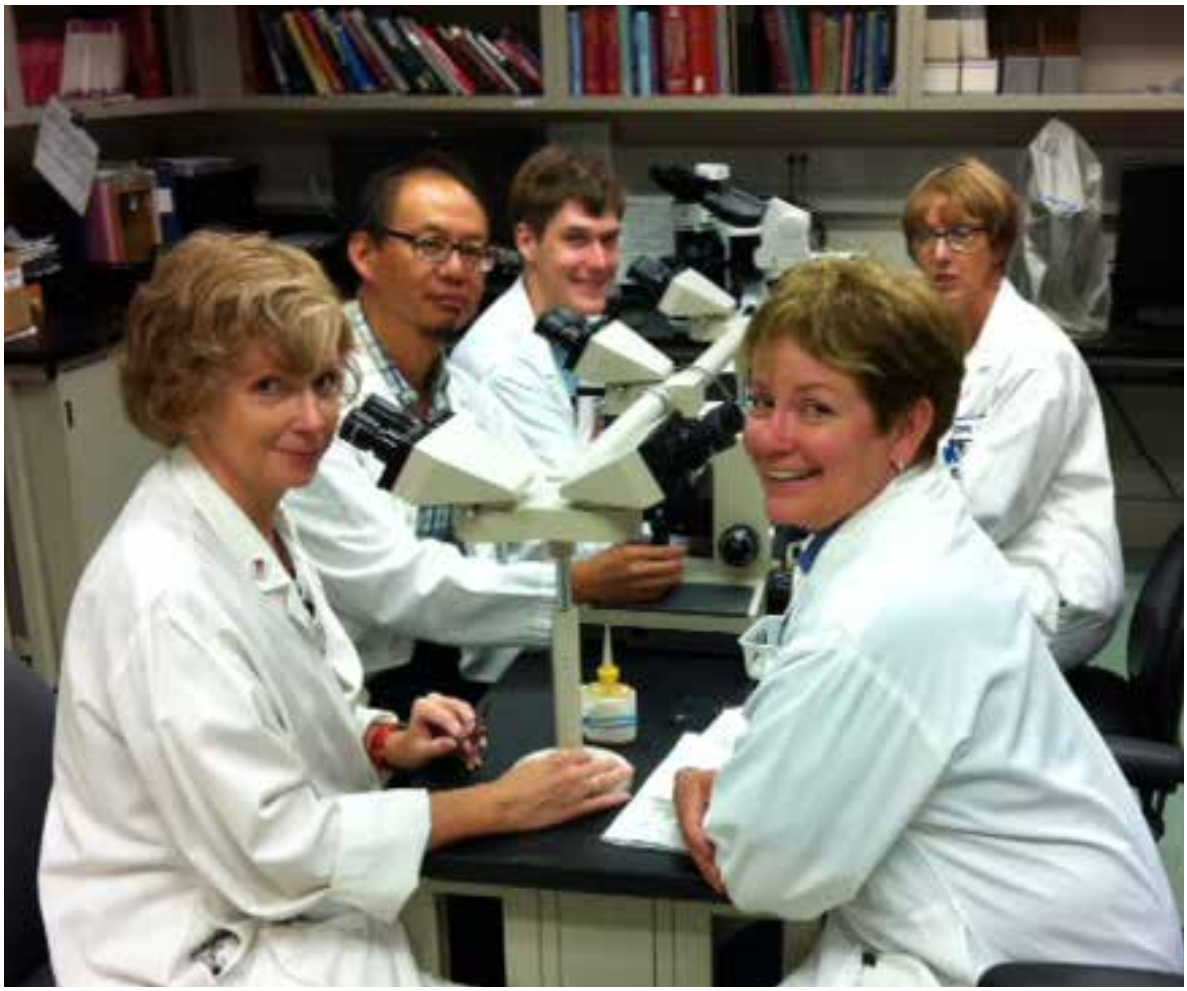
Hemostasis and Thrombosis Testing

Hemoglobinopathy and anemia investigations are also performed by the Investigational Hematology laboratory. This regional service plays a pivotal role in the diagnosis of non-malignant hematological disease. Close collaboration with the services of Genetic Counseling and Pediatrics ensures timely and reliable results for patients.



Hemoglobinopathy Testing

Investigational Hematology continues to provide support to the Core Laboratory in procedural and process development and renewal. Presently, a project is underway evaluating the utility of microscopic evaluation of peripheral blood films in isolated cases of microcytosis. In cases of microcytosis (MCV <75 fl), it is the current practice to evaluate red cell morphology both by a technologist and then by a Hematologist. An algorithm has been developed and is currently being tested within the laboratory information system where an interpretive comment could be automatically appended to the CBC results when specific criteria are met. It is anticipated that by adopting this practice, the AV (auto verification rate) of CBCDs will increase and review rates would significantly decrease thereby increasing laboratory efficiency and improving consistency of reporting practice.



Teaching Laboratory Technology Students

Blood Transfusion Laboratory

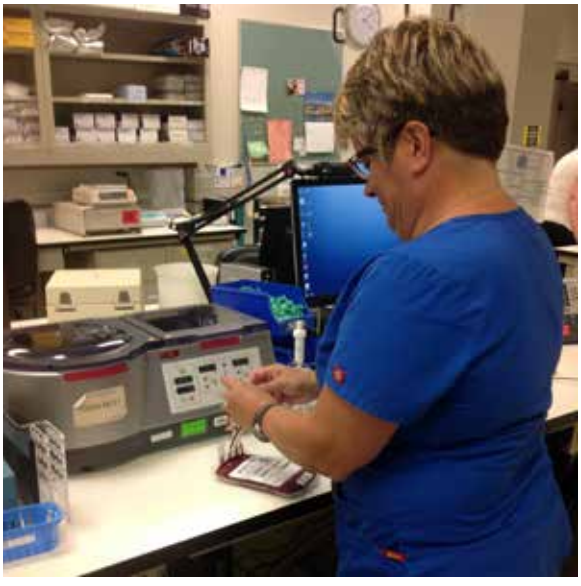
The Blood Transfusion Laboratory provides an essential 24/7 service for Transfusion Medicine, Stem Cell Transplantation, and Tissue Banking for London Health Sciences Centre (LHSC) and St. Joseph's Health Care (St. Joseph's). Supporting emergency services, trauma, surgical services, oncology, multi organ transplant and bone marrow transplant the Transfusion Laboratories are the third largest Blood Bank in Ontario, transfusing more than 24,000 units of red cells annually. LHSC was the first hospital in Ontario to be inspected under the new Health Canada Blood Regulations. The inspection lasted four days as the inspector reviewed all aspects of blood and blood product safety as it pertains to the services provided by LHSC.

Antibody Investigation

This year has seen a number of changes to the Transplant Program. The Stem Cell Transplant Program went through an External Review by Health Canada. New regulations have been implemented, as well as a position and support identified for a Program Coordinator in Stem Cell Transplant. Due to increasing pressure to increase our stem cell transplant numbers, this will lead to the expansion of this program over the next five years.

The Blood Transfusion Laboratory continued to participate in a number of research initiatives such as the PREPAReS Study which evaluated the effectiveness of a pathogen reduced platelet product and the ABC PICU Trial which is a trial designed to evaluate the clinical outcomes of transfusing fresh blood versus standard blood in critically ill pediatric patients.

The Blood Transfusion Laboratory actively participates in the education of healthcare professionals from Medical Laboratory Technology students to Anesthesiology Residents and Hematology Fellows.



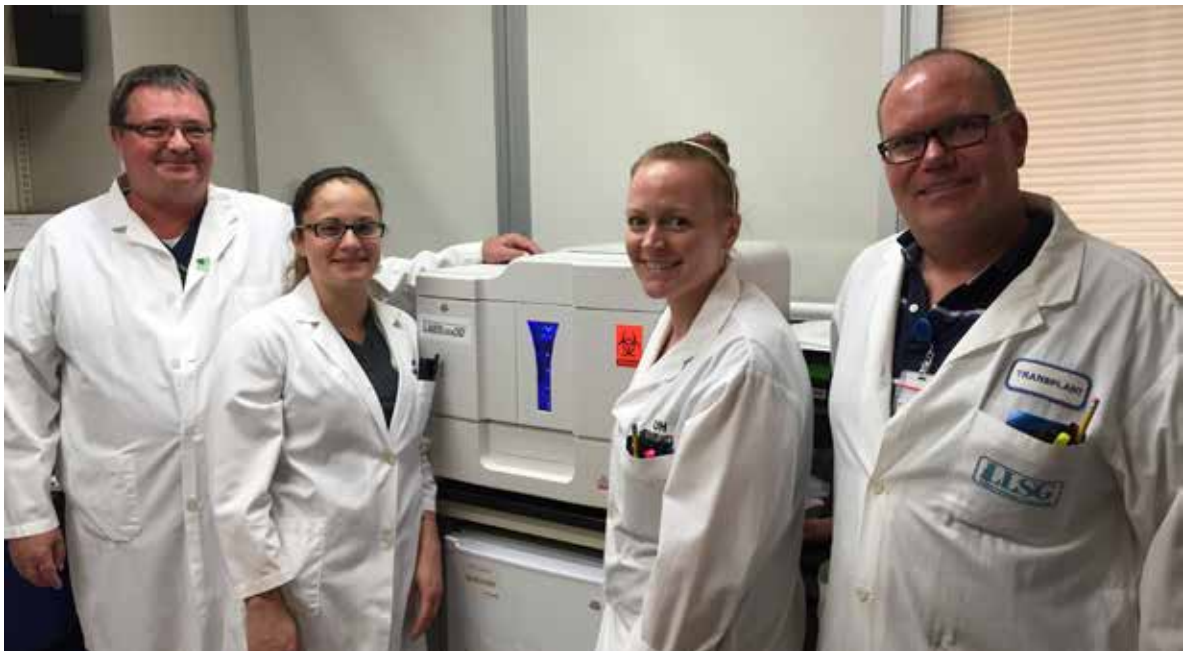
Blood Transfusion Laboratory

Transplant Immunology

For more than 40 years, the Transplant Immunology Laboratory has played a key role in supporting the Multi-Organ Transplant Program at London Health Sciences Centre (LHSC). This is the only laboratory of its kind in Southwestern Ontario and services an area from Windsor to Kitchener, and as far north as Sudbury and Sault Ste. Marie. The lab is certified by American Society of Histocompatibility and Immunogenetics (ASHI). Division Head Dr Qingyong Xu and laboratory staff provide histocompatibility testing and cross-matching 24-hours a day, seven days a week.

Annually, approximately 160 patients receive life-saving organ transplants for kidney, heart, liver, combined kidney/pancreas or combined liver/kidney. Most of the organs are from deceased donors and the rest are from living donors. The living donor program expands every year as the need for organ donors continues to rise.

The laboratory also provides histocompatibility support for the allogeneic hematopoietic stem cell transplantation program and plays a key role in risk assessment and donor selection for patients who need live-saving stem cell transplants. Currently, transplants done at LHSC are solely from related donors such as a brother or sister. In the near future, this will be expanded to unrelated donors from registries worldwide. Transplant Immunology acts in collaboration with provincial (Trillium Gift of Life Network), national (Canadian Blood Services) and many international donor registries to better serve our patients.



Transplant Immunology Staff

Laboratory Instrumentation

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