



2017

Annual Report

The Department of Pathology and Laboratory Medicine

schulich.uwo.ca/pathol

Table of CONTENTS

01		
General Information	Message from the Chair	04
	About Pathology & Laboratory Medicine	06
	Mission, Vision, Values	08
	Highlights of 2016-2017	10
	Leadership	14
	Organization	16
02		
Education	Education Overview	18
	Undergraduate Education	19
	Graduate Education	23
	Postgraduate Education	24
	Advanced Training	27
	Continuing Professional Development	28
03		
Clinical Service	Clinical Service	32
	Program of Pathology	32
	Program of Laboratory Medicine	37
04		
Research	Research Spotlight	46
	Research Overview	48
	Research Funding Statistics	50
	Publications	51



Message from **THE CHAIR**

As I reflect on 2017, let me first thank all of you, our faculty members, staff and trainees, for your commitment, your enthusiasm and the dedication that you have demonstrated through your incredible work throughout the past year. I am so fortunate to lead this department and I am proud of all our faculty members, staff and trainees both at our university and in our hospital departments.

Over the last year we have welcomed a large number of trainees, staff and faculty members to join in our journey. We have successfully launched a new education program in One Health. Our clinical side is bustling with new activities. We have started a major undertaking, laboratory transformation, this ongoing process will cause significant changes in several of our operations.

Our faculty members have been successful in multiple grant competitions. Among other major activities, and for the first time, we have started a combined strategic planning process for university and hospital departments. This process will help us to steer in the right direction over next several years. I sincerely appreciate your active participation in this process.

As we look towards the future, I am sure 2018 will come with new opportunities and new challenges. With ongoing uncertainties in the funding for both the hospital and university departments, our operations and continued growth may be challenging. I am sure, however, that with all your help, we will be able to reach our goals.

I am immensely honored to be counted among you all as a colleague and I deeply appreciate all that you have done this past year for the department.

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.

Best wishes,

Subrata Chakrabarti

Dr. Subrata Chakrabarti
Chair/Chief
MBBS, PhD, FRCP(c)

PaLM: Seeing small, thinking big



Dr. Subrata Chakrabarti

About PATHOLOGY AND LABORATORY MEDICINE

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

Translational Department

The Department of Pathology and Laboratory Medicine is unique and very complex with a basic science research department located at Western and a large clinical department in the London Hospitals. This allow us to be an effective conduit and facilitator of multidisciplinary and translational research, and cross-disciplinary teaching initiatives.

The Department at a glance at September, 2017

Founded: 1945

Chair/Chief: Subrata Chakrabarti

2016-17 Total Grant Funding: \$6,285,000

THE DEPARTMENT AT A GLANCE AT SEPTEMBER 2016

61

Full Time Faculty

412

Hospital Staff

33

Adjunct Appointees

18

Residents and Fellows

16

Cross Appointees

53

Graduate Students

8

Full-Time University Staff

21

BMSc Undergraduate Students

Our MISSION

“We must become the change we want to see”

- Mahatma Gandhi (1869-1948)

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

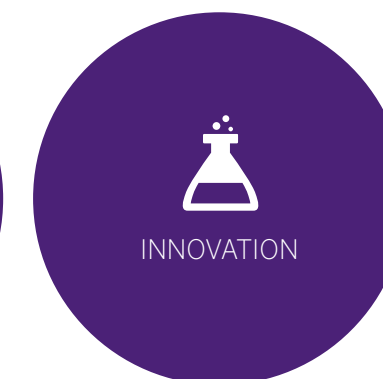
TEAM WORK

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.



2016/17 HIGHLIGHTS

Welcome New Faculty

July 2016 - Dr. Stephanie Frisbee,
PhD, Scientist in cardiovascular health
and disease, Assistant Professor

July 2016 - Dr. Aaron Campigotto,
Medical Microbiologist, Assistant Professor

August 2016 - Art Poon,
PhD, Scientist in viral evolution, Assistant Professor

November 2016 - Kate Bone,
PhD, Cytogeneticist, Assistant Professor

Congratulations to our Long Service Award recipients

2016 London Health Science Centre

30 Years

Dr. Mariamma Joseph - Pathology Program

25 Years

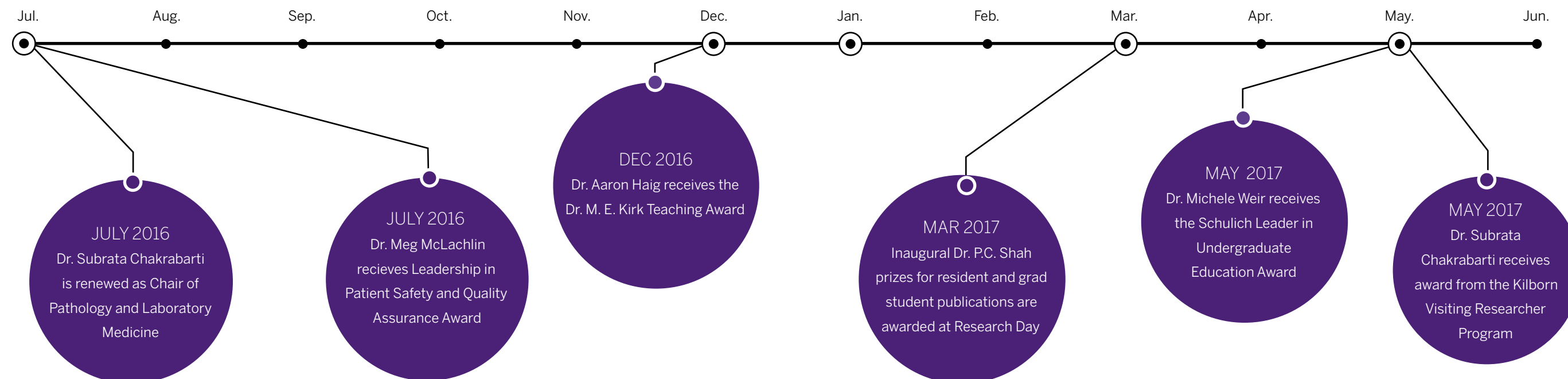
Dr. Madeleine Moussa - Pathology Program

15 Years

Dr. Keith Kwan - Pathology Program

Dr. Bret Wehrli - Pathology Program

Dr. Michelle Weir - Pathology Program



Awards and Honours

July 2016 – Dr. Meg McLachlin is the recipient of the Leadership in Patient Safety and Quality Assurance Award at the 67th Annual Meeting of the Canadian Association of Pathologists.



Dr. Meg McLachlin

December 2016 – Dr. Aaron Haig receives the Dr. M. E. Kirk Teaching Award



Dr. Aaron Haig

December 2016 – Dr. Cady Pocrnich receives her official Diploma for AFC in Cytopathology.

March 2017 – Inaugural Dr. P.C. Raju and Jyoti Shah prizes for resident and grad student publications are awarded at Research Day.

May 2017 – Dr. Michele Weir receives the Schulich Leader in Undergraduate Education Award.

May 2017 – Dr. Subrata Chakrabarti receives award from the Kilborn Visiting Researcher Program

Leadership

July 2016 – Dr. Subrata Chakrabarti is renewed as Chair/Chief of Pathology and Laboratory Medicine



Dr. Subrata Chakrabarti



A holiday tradition continues as the Department, staff and resident elves prepared dinner at Ronald McDonald House.

Commitment to the Community

September 2016 – Duennwald lab came together to support the Walk for ALS in London's Springbank Garden park.

November 2016 – Pathology and Laboratory Medicine held a sock drive, for donation to the Salvation Army Street Ministry. Two Christmas sacks full of socks were collected for community members in need.

November 2016 – The department held a toy drive in the weeks leading up the holidays. Toys and other gifts were donated to Toy Mountain and Toys for Tots.

December 2016 – Pathologists, staff and residents prepared dinner at the Ronald McDonald house, for families in residence at the house.

May 2017 – Emily Kyle, a trainee in the Pathologists' Assistant Graduate Program, walked for Alzheimer's in Springbank Gardens.

In Memoriam

Robert Andrew Goyer, BSc, MD, FRCP(C)
June 2, 1927 - February 21, 2017 (Age 89)

It is with great sadness that we announce the passing of Dr. Robert Andrew Goyer, Emeritus Professor of the Department of Pathology and Laboratory Medicine.

Dr. Goyer served for two terms as the Chair and Chief of the Department of Pathology and Laboratory Medicine at Western University and University Hospital, appointments he held until his retirement in 1992.

A clinical pathologist with special interests in pediatric pathology, Dr. Goyer was an internationally renowned expert in the toxicity of metals and interactions of toxic metals with nutritionally essential metals. He published over 170 journal articles, reviews and book chapters in this field of research.

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.



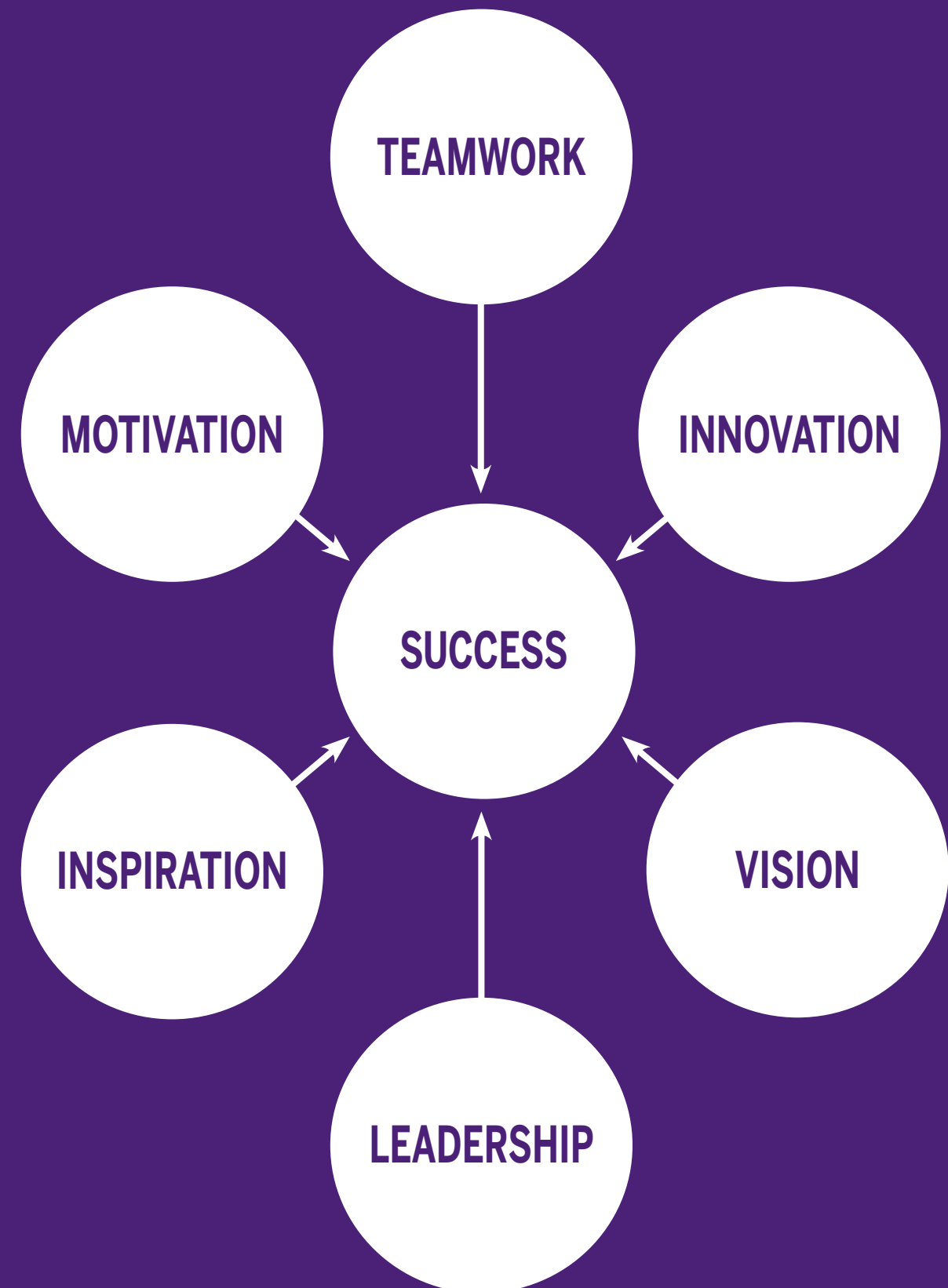
IAN CHIN-YEE
Program Head
Laboratory Medicine

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,
Medical
Microbiology,
Cytology,
Autopsy
Services and
Molecular
Pathology.



Academic ORGANIZATION

UNDERGRADUATE EDUCATION

UNDERGRADUATE BACHELOR OF MEDICAL SCIENCES

Zia Khan
Undergraduate Chair

UNDERGRADUATE MEDICINE

Ted Tweedie
Meds 1 & 2 (Interest Group)

Mariamamma Joseph
Meds 3 (Pathology Case Conference)

Michele Weir
Meds 4 (New Curriculum)

Helen Ettler,
Meds 3 & 4 (Electives/Selectives)

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

Rob Hammond
Program Director

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
Departmental Technician

Kathilyn Allewell
Media Specialist (on leave)

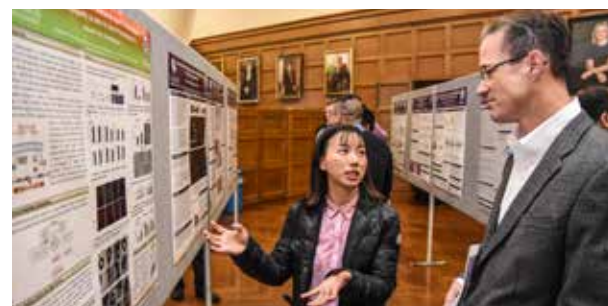
Sandy Rattana
Media Specialist (acting)

Susan Underhill
Administrative Assistant

Education PROGRAMS

Message from the Director of Education, Dr. David Driman

Education remains a top priority and focus of our department. By many measures, this is reflected in how attractive our courses and programs are to potential students, and to outcomes within courses and programs. Many of our educational offerings are greatly over-subscribed with regard to applications and we continue to produce highly successful students and trainees who go on to further training or clinical practice. These successes are a testament to the dedication of all our faculty members who teach at many different levels in the Faculty, and to our many diligent students.



2017 Research Day



Dr. Zia Khan's Bachelor of Medical Science group

UNDERGRADUATE EDUCATION

Undergraduate Bachelor of Medical Sciences

Our undergraduate Bachelor of Medical Science (BMSc) modules continue to attract excellent and eager trainees. Admittance to Pathology undergraduate modules occurs in year three and is based on the performance of the students in select courses.

This method is typical of all BMSc modules at Schulich Medicine & Dentistry, and is currently the only way to adjudicate students. If taken as a measure of trainee performance and caliber, the grade average of our students highlights our position in the BMSc program. We should be proud of the fact that the grade average of students in our modules ranks at the top of all BMSc modules.

Over the years, we have made significant improvements to our undergraduate BMSc program. We have expanded the number of modules, introduced an interdisciplinary One Health Honors program, created a new Pathology course (Pathology 3700F/G), and diversified the scope of research proposals for our thesis students. We currently offer the following modules in the BMSc program:

- An Honors Specialization (thesis) in Pathology
- An Honors Specialization (thesis) in One Health
- A Major in Pathology (non-thesis), which can be completed only in combination with another Major
- Three Honors Specialization (thesis) 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 and graduated 14 Pathology honors specialization students, two honors students each from our combined modules with Microbiology and Immunology and Computer Science, and 8 students in the Major module. The number of students in our programs has steadily increased from 5 honors students in 2009 to 18 in 2016. We welcomed 20 students for the 2017-2018 academic year. We are anticipating further growth and interest in our programs because of the implementation and offering of the new

interdisciplinary program in One Health. It would be reasonable to expect 27-30 students in 2018.

Future Plans:

As we look to the future, we have tremendous opportunities to grow our program. In all BMSc honors (thesis) modules, the major limitation to enrollment is the number of available research projects. Even though the number of typical basic and clinical science research opportunities offered to our Pathology honors students may be at our maximum capacity, we can anticipate growth through the One Health program. One Health was designed to be interdisciplinary and to cross Department and Faculty boundaries. Hence, we may be able to tap into a large resource of research activities at Western when we solicit research proposals for

the One Health students. This program may also enhance our departmental research capacity and productivity as it may lead to new research collaborations.

Undergraduate Dentistry

In the Schulich School of 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 2016 -17. The courses have remained essentially unchanged from previous years. Oral Pathology was instructed in the 1st, 2nd and 3rd dental years in the form of Oral Diseases 5170, 5235 and 5335; and as Oral Pathology 5304 for Internationally Trained Dentists.

Successes include a 100% pass rate for all courses, generally with average grades in the mid-70s to low 80s. Students' interest in Oral Pathology appears to peak in the 3rd dental year, perhaps due to methods of delivery and content emphasis on common conditions outside of tooth related pathology. Courses are made available online through Sakai OWL, and the laboratory course is delivered using a problem based approached, encouraging student participation in discussion. Dr. Darling received the USC Teaching Honour Roll award for excellence in teaching in Dentistry. Dr. McCord piloted the use of virtual microscopy in the Oral Diseases 5335 laboratory course with success, and it is anticipated that this will be utilized for all the laboratory courses in future.



LPA Christmas Party 2016



Paterson Lecture

The School of Dentistry underwent accreditation in 2017. It is anticipated that there will be future curriculum changes which may mean changes to the Oral Diseases curriculum. Dr. Darling serves on the Curriculum Committee for Undergraduate Dentistry, and would participate in curriculum development. Looking ahead, some issues with the current Oral Pathology curriculum may need to be addressed in anticipation of curriculum modernization. Fragmented delivery of topics, which occurred due to synchronization with other areas of the dentistry curriculum, will have to be further corrected to streamline subject matter so as to be more meaningful for students. Future plans include continuing to develop online learning through the OWL online course management system, and use of virtual microscopy.

Undergraduate Medicine Education (UME) in Pathology

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 we believe a graduating medical student should learn and demonstrate by the end of fourth year in preparation for and transition to residency.

Present UME Education

Activities (Med 1 — Med 4):

All activities (2016-2017) related to UME in Pathology spread over 4 years (Med 1-4) are progressing well. We have completed two "Pathology Interest Group" sessions for Med 1 and 2 which were organized by med student interest group coordinators.

Our faculty provided four Med 3 pathology case conference seminar series during the past year. In order to equip residents for successful pathology teaching, we trained a number of pathology residents this year who actively participated as organizers and teachers. The hands on cytology division workshop on "Fine Needle Aspiration Cytology" procedure and smear preparation was well received by the students.

We offered Pathology Electives (2 weeks) to a number of medical students from Western and external universities as part of Meds III and IV Clinical Clerkship. This year we expanded the number of faculty supervisors and developed a guide in the form of a booklet to be used by supervisors and students. The "Resident Buddy System" for Med 3 & 4 selective/elective students is well established in our department; the teaching and mentoring initiatives from our residents were well received by the students.

The Meds 4 Integration and Transition (I&T) course module on dyspnea and the Physicianship component on patient safety and medical ethics have been removed from the curriculum as part of curriculum realignment at UME.

Future UME Activities:

UME Curriculum Planning and Implementation (Med 1 — Med 4): The Schulich School of Medicine & Dentistry is actively engaged in UME curriculum transformation. The goal is to develop a more fully coherent, coordinated and integrated curriculum (all 4 years) to foster lifelong learning. CBME theme is built into this new curriculum. Dr. Weir represents our department at the UME level. A draft road map of this new and recently accredited curriculum is available to us.

Recently a basic science integration task force subcommittee including members from Departments of Anatomy & Cell Biology, Physiology & Pharmacology, Microbiology & Immunology, and Pathology and Laboratory Medicine has been formed to discuss specifically planning of Meds 1 “Foundations of Medical Care” block (3 months, Sept, Oct, Nov, Med1). The goal is to create an integrated basic science & clinical foundation block utilizing multiple teaching methodologies which may include short structured courses, labs, small/large group discussion sessions, shadowing experience and student and faculty led case based learning. There will be more e-learning material and less class room lectures. Students

get more opportunity to learn the basic science material in a clinically relevant way. Things are starting to move forward, draft models are being discussed and new ideas are being sought to build a strong “Foundations of Medical Care” block.

In order to encompass the exciting and challenging needs of this new curriculum, we expanded and restructured the existing departmental Undergraduate Medicine Education in Pathology Committee as follows (Chair: Dr. Joseph, Members/ Sections: Dr. Weir (Med 1&2 new curriculum), Dr. Tweedie (Med 1 &2 Interest group), Dr. Joseph (Med 3 pathology case conference, assisted by Dr. M. Cecchini, resident), Dr. Ettler (Med 3 &4 electives/selectives). In



WPA Young Investigator Seminar Series: Dr. Emily Keats

addition a small subcommittee encompassing select faculty members and residents is formed to plan and oversee the upcoming curriculum related activities.

Looking Ahead:

Our department is fortunate to have a group of passionate and enthusiastic teachers and education leaders. Active resident involvement in medical student teaching is very positive. We look forward to the renewed opportunity to build a strong “Foundations of Medical Care” block in Med 1 as part of UME curriculum realignment.

GRADUATE EDUCATION

Research Based Graduate Program

The Graduate Program in Pathology and Laboratory Medicine continues to maintain a strong commitment to graduate education. MSc and PhD degrees are offered to students who are interested in acquiring more extensive knowledge of the mechanisms and drivers of disease progression and patterns of disease emergence. Our program has grown and evolved over its long and rich history, from a handful of graduate students

in the early years to a robust program today which boasts a stable enrollment and excellent opportunities for further growth.

We have at present, a total of 18 PhD students and 17 M.Sc. students in our research-based program. Our program has never had such a high number of students (especially at the PhD level) in the past.

Looking Ahead:

With the launch of “One Health” field, we anticipate further growth in our graduate program.

Masters of Clinical Science (MCISc) Pathologists' Assistant Graduate Program

The MCISc Pathologists' Assistant program has seen another 6 students complete the program, well prepared to join the PA profession. All 12 students in the two year program did well during their first year of coursework and second year practicum experience. New to this academic year was a formal grossing course, run by Dr. J. Gomez-Lemus. There were many achievements this year. Our six second year students presented at the department's annual research day. The two recipients of research day



2017 Pathologists' Assistant Program Graduating Class

awards will represent our program at the American Association of Pathologists' Assistant annual meeting in San Antonio, Texas in September 2017. This year also marks the 10th anniversary of our program. In celebration, the inaugural Dr. Subrata Chakrabarti Pathologists' Assistant Graduate Award was presented at Research Day.

This academic year also welcomed the return of two alumni. Ms. Katie Logan returned to give a talk to current and prospective students, titled "The Road to Becoming a Pathologists' Assistant – the Good, the Bad, and the Ugly". Mr. Lei Gong also returned to give a talk on how to

prepare for the American Society for Clinical Pathologists and Canadian Certification Council of Pathologists' Assistants board examinations. Both alumni gave excellent talks that were well attended and received.

We continue to be a competitive and sought after program. Over a hundred applications were received for only six seats for the incoming fall class. The top six ranked applicants receiving offers of admission all accepted. In continuation of our excellent job placements, all members of the graduating class have been employed before their graduation date.

POSTGRADUATE EDUCATION

Anatomical Pathology Resident Training Program

The Anatomical Pathology residency program has had a busy, productive year in 2016-17. We continue to have a full cohort of residents (10 total from PGY1 to PGY5), with two new PGY1s scheduled to start July 1, 2017.

The residents continue to be heavily involved in the department. Aside from the clinical component, residents have taken on active roles in medical education, research and the molecular pathology



Dr. Aaron Haig, recipient of the Dr. M.E. Kirk Teaching Award

service. Several residents have been particularly innovative incorporating pathology and social media. We piloted an Introduction to Pathology rotation for the PGY1 residents, prior to the start of their PGY2 core pathology training, with positive feedback.

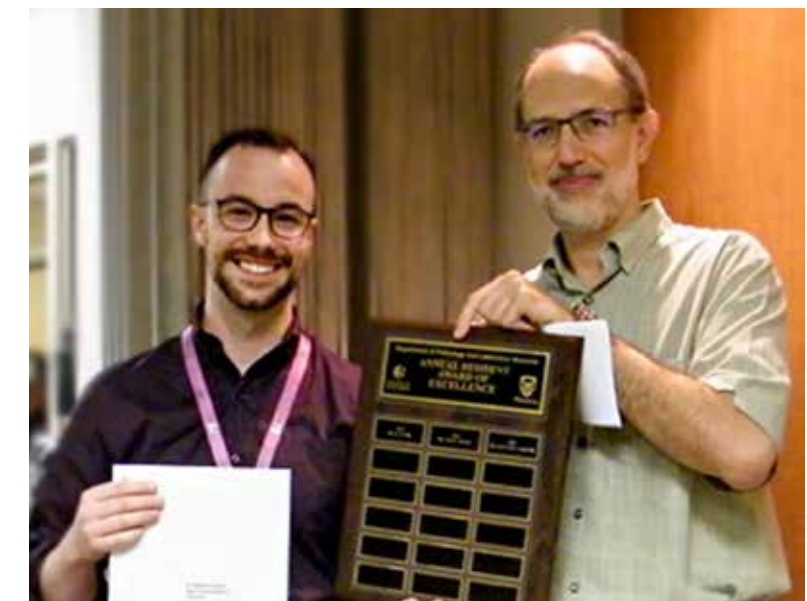
Looking ahead we will continue to prepare and implement changes as part of the transition to competency-based medical education in collaboration with the Royal College. As well, the Anatomical Residency Program will undergo an internal review in the fall of 2017.

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

Successes over the past year have included:

1. PGY5s successfully passing the Royal College examination (continuing a 27-year perfect pass rate)
2. Numerous resident awards at the CAP National Conference
3. Successful Resident Research Day.



Dr. Matt Cecchini awarded the 2017 Resident Award of Excellence in Pathology



Dr. David Garcia-Marquez and Dr. Will Stecho successfully passed the Royal College Examination in Anatomical Pathology.

policy reflects the shortage of neuropathology posts in Canada for qualified Canadian neuropathologists and is in line with the internationalization initiatives of Western University and the Schulich School of Medicine and 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 trainee body consists of one Canadian medical graduate, one Canadian graduate of a foreign medical school, two international residents (both sponsored by the Saudi Arabian government) and one Canadian clinical fellow with Anatomical Pathology training.

This core complement of trainees was supplemented in 2016/17 by eleven elective period residents from other Western Residency Training Programs (3 from Neurology,

6 from Neurosurgery and 2 from Anatomical Pathology) as well as medical student observerships and electives.

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 also

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 was most recently accredited by the Royal College of Physicians and Surgeons of Canada in 2012 with its next scheduled accreditation in late 2019. The training is also accepted by the European Confederation of Neuropathological Societies for the qualification examination of the European Fellowship in Neuropathology (EFN).



Resident and Fellow Celebration Tea

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.

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 approximately five times the number of applicants to available positions. 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.

There were two fellows in the Department in 2016-2017. Dr. Brian Schick in gastrointestinal and liver pathology, and Dr. Qi Zhang in Neuropathology. Both fellows had successful training and experiences, and contributed to the research, education and service missions of the Department.

Area of Focused Competence (Diploma) in Cytopathology

This is our fourth annual report and the team took a well-needed break from training with few changes over the year. Our second trainee completed our program in June 2016 and received the Diploma from the Royal College in October 2016. Both of our prior trainees are/will be working at academic centres and

subspecializing in cytopathology, which is the mandate of the AFC Cytopathology programs nationally. Our third trainee from the University of Calgary will start in July 2017. We will not be training anyone for 2018-19 because funding is dependent on limited departmental resources. 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. Our program piloted the new e-logbook from the Royal College for our AFC program; however the time and energy required to input thousands of cases was too high and an alternate route for a summary of the trainee's cases has been established this year. There have been no other major changes to the program. The team is looking forward to training our next candidate.



Advances in the Practice of Cytopathology

CONTINUING
PROFESSIONAL
DEVELOPMENT

Pathology and Laboratory
Medicine Grand Rounds

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

Resource Development group is going to provide a speaker for one Grand Rounds session each year in order to reach a larger audience with our departmental educational plan. Four speakers have been confirmed for the 2017/2018 dates.

The strength of our Grand Rounds seminars lies in the delivery of a wide range of topics, having departmental support to bring in speakers, and the willing participation from Western faculty. We did experience relatively low attendance since moving to lecture theatres and

drop in attendance since losing lunch. We are hoping to overcome this challenge with our ability and interest in bringing in prominent and relevant guest speakers. We plan to advertise to the broader medical community when appropriate and collaborate with the Novel Education Resource Development group for one session per year.



Grand Rounds Lecture

GRAND ROUNDS

Date	Presenter	Title
September 2016	Dr. Robert Hammond MD, FRCP(C), Associate Dean, Admissions Schulich School of Medicine & Dentistry	Medical School Admissions Under the Microscope
November 2016	Dr. Johan Delport MBChB, M.Med Pathology (Microbiology), Assistant Professor, Pathology and Laboratory Medicine, Schulich School of Medicine & Dentistry	MALDI-TOF Improves Quality of Care
January 2017	Dr. Paul Adams Professor of Medicine and Chief of Gastroenterology, Western University	The Art of Hepatology
April 2017	Last minute speaker cancellation	

CME Events

Multi-header microscope workshops

The Department of Pathology and Laboratory Medicine continued the series of multi-header microscope workshops for community pathologists. An additional workshop in Hematologic pathology was held in spring 2017 and a GU pathology workshop is taking place in September 2017. Feedback from attendees continues to be excellent but several attendees would prefer the sessions to take place at the weekend.

Successes in the past year are attributable to our access to the abundant expertise within our department, to excellent feedback and to the willingness to attend from community pathologists. Our challenges lie in the difficulty to get local faculty to sign up for sessions and the fact that some community pathologists are unable to attend as sessions are held on a weekday. We hope that having a team sign-up sheet will enable planning for future dates. An ongoing challenge is maintaining motivation of local faculty.

The Ontario Cytopathology Day with Bedard Lectureship in collaboration with Mount Sinai Hospital took place on October 22nd, 2016 at Mount Sinai Hospital, Toronto, with speakers from Western included in the lineup. Our 2017 event, "Advances in The Practice of Cytopathology" is scheduled for October 21st in London, speakers are confirmed and sponsorship has been secured from LifeLabs, Roche Diagnostics, Hologic, Cancer Care Ontario and the Michener Institute. Advertising has been sent out via e-blasts, the Pathology and

Laboratory Medicine website, Schulich Medicine & Dentistry Continuing Professional Development and the Ontario Association of Pathologists.

Cancer Care Ontario Educational Event

"Updates in Selected Topics in Pathology", a Western University and Cancer Care Ontario Program, took place in March 2017. This collaborative half day event took place at Spencer Hall and was designed to meet the learning needs of community pathologists. Four local faculty presented and were given excellent feedback from attendees.

Novel Education Resource Development (NERDs) 2016-17

The NERDs group is an educational interest group created in 2014 which provides resources and a community of practice for teaching activities as well as scholarship and leadership in education for our department. The group builds resources for novel learning techniques in instruction, design & assessment as well as scholarship in education for faculty and learners.

Over the last year we have been creating resources for enhancing faculty and learner development of educational skills; and building a community of practice for sharing successes, experiences and challenges. We have continued to build on-line resources on our OWL website with links to Western University Teaching Support Centre, Schulich Continuing Professional Development and the Royal College of Physicians and Surgeons. Our open forums have continued over the year and topics included: sharing of education scholarship experiences by faculty and learners, approach to large group discussion, technology tips for large group discussion, competency based medical education (CBME) and co-operative learning in medicine.

Our impact has included a growth of scholarship in education within our department with multiple posters & presentations at departmental, national and international research forums and conferences, as well as at the 2016 annual Centre for Education Research & Innovation (CERI) research

symposium. There has been increase use of new techniques and technologies in academic half days (flipped classrooms) and small group discussions (SGD) including the introduction of pre-SGD huddles. Future direction for the upcoming year include sponsoring of a Grand Rounds by the NERDs on a CBME topic, migrating our resources from OWL to a more accessible site, continued open forums with topics on CBME, coaching & feedback, use of technology for pathology and flipped classroom techniques.



Multi-header microscope workshop

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, SJHC) 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 3 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 over the past five years. This increase has occurred most notably in GI specimens. With the future implementation by CCO of FIT-positive colonoscopy testing, further increases in GI workload are expected. This workload is estimated to increase our staffing needs, for pathologists of 1 FTE, and other staff. 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



Cytopathology

to show a breakdown of turnaround times for each step in the laboratory process. It can thus demonstrate fluctuations in TAT 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 more efficiently and accurately complete synoptic reports on cancer cases and will allow us to meet the CCO standard of 90% complete reports. Implementation has been delayed due to issues arising between mTuitive and Cerner. Projections are for implementation by August 5, 2017.

We are participating in the Quality Management Partnership, a new provincial pathology quality initiative. On the initial 2016 survey on 10 prioritized standards, we were 100% compliant. The 2017 QMP

survey has been completed with results expected later in 2017. A QMP regional engagement event for LIHN 2 was held in June.

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.

Cytopathology

The Cytology Laboratory provides a wide range of diagnostic services to physicians in London and many regional hospitals. We deliver expert cytology



Autopsy

consultation service to regional pathologists. The strength of our lab lies in its continued efficiency in providing test results with TAT in lab target. We have a robust ongoing technical and professional quality management program in place. We are pleased to introduce Mr. Gavin Giles, who recently joined as the new coordinator for cytopathology division.

In 2016, we received 20,208 cytology cases (GYN 7913 and Non GYN 12295) in our division. Our cytotechnologists continue to provide an efficient and highly valued Rapid Onsite Evaluation (ROSE) FNAB service to clinicians located at all 3 sites (1152 cases in 2016). Our regional cytology service partnership with various South Western Ontario hospitals is running quite well. In order to sustain a strong partnership with our clients, our cytology team recently completed a review and discussion Video conference session with our corresponding leaders at Stratford. We are also making plans to reach out to our remaining partners in the region in the near future. In collaboration with molecular

pathology lab, we have already introduced a number of molecular tests (ALK, EGFR), related to cancer therapy on small cytology samples. Validation process for PDL1 is being planned in the near future.

A cytopathology CME event focused on cytotechnologists and pathologist is scheduled for October 21, 2017. This full day symposium will be held in Auditorium A, University Hospital, London.

Autopsy

The autopsy service, based at University Hospital, is a monitor of quality assurance for the LHSC clinical services and an essential component, as a regional forensic pathology unit, of coroners' death investigations in Southwestern Ontario.

In 2016, the total number of autopsies (hospital authorized and coroner's warrant) decreased 5.0% (from 637 to 605) compared to the previous year;



Molecular Diagnostics

however, there was a 6.6% increase in coroners' cases (470 to 501). A 38% decrease in hospital authorized autopsies (167 to 104) reflects worldwide trends; however, the complexity of the cases has increased. The proportion of coroners' cases originating outside of London done in the LHSC facility was 46% compared to 42% the previous year. In 2017, an increased coroners' autopsy caseload is anticipated which will continue to challenge human resources in our Department.

Drs. E. Tugaleva and M. Shkrum supervised Audrey Evetts who successfully defended her MSc thesis on "Organ weights and measures in infants aged one month to one year investigated by the Office of the Chief Coroner." The data from this research is being prepared for publication and will be an invaluable reference for pathologists who do medicolegal pediatric autopsies. Dr. M. Shkrum continued in his role as the Director and Principal Investigator of the Motor Vehicle Safety (MOVES) Research Team, Schulich School of Medicine & Dentistry. His MSc

student – James Roos – successfully defended his MSc thesis entitled – "Etiology of Motor Vehicle Collisions Fatalities in Urban and Rural Canada". Dr. Shkrum is currently supervising another MSc candidate – Peyton Schroder – who is studying factors contributing to trauma in pediatric rear occupants injured in motor vehicle collisions.

Molecular Diagnostics

The Molecular Diagnostics Division is comprised of the Sections of Biochemical Genetics, Cytogenetics and Molecular Genetics. The Division provides specialized genetic testing including inherited metabolic disorders, chromosome analyses/FISH, microarray analyses, nucleic acid sequencing, and a wide variety of gene tests for inherited disorders, predictive cancer testing and therapeutic monitoring. The Division also serves as a reference laboratory for multiple tests (such as inherited peripheral neuropathies, mitochondrial disorders, heritable cancers and postnatal constitutional

microarray testing for individuals with autism, developmental delay and multiple congenital anomalies) at the provincial level and performs some testing at the national level.

Testing for many inherited diseases, inherited and acquired cancers has now advanced to using technologies that interrogate panels of genes simultaneously and/or entire genomes. The numbers of specimens tested in the Divisions continue to increase each year; and more importantly the complexity of testing and interpretation has significantly increased workload per case. The Division works closely with other divisions in our department and in other hospital departments, as well as with clinicians in the community to support personalized medicine. Over the past year, we have increased technical coverage and acquired new technology (increased automation and next generation sequencing [NGS] capability) to meet our growth, expand our test menu and participate in other provincial opportunities. A major goal for the division in the future is to improve our depth of professional coverage. Our efforts are being supported by Hospital Leadership, MOHLTC and CCO.

Microbiology

Specimen volumes and complexity of testing continue to increase within microbiology. In molecular microbiology, we have begun to test and report our CMV assay in International Units (IU) based on the World Health Organization International Standard to increase reproducibility and are in the process of moving EBV reporting to IU. A new testing method/algorithm for CSF viral studies is being evaluated and will improve the time to result.

Several utilization and quality improvement initiatives have been undertaken. A new algorithm for urine testing has decreased unnecessary urine cultures by 25%. The laboratory is working with IS to standardize the way in which microbiology results are displayed in PowerChart. These changes will improve the client user experience by making the reports easier to read and decrease interpretation errors. Improvements aimed at detecting more bloodstream infections are underway through collaborations with the Vascular Assess Support Team (VAST). Blood culture collection procedures are being updated to standardize collection and ensure that adequate volumes are being collected to maximize sensitivity.



Microbiology

Looking ahead, we continue to partner with regional hospital associations, including Middlesex Health Alliance and Huron Perth Healthcare Alliance to ensure their access to quality lab services and to develop shared practice standards. Test cost analysis has been completed with a view to offering advanced molecular testing to regional hospitals. Further initiatives of the Choosing Wisely Campaign will be implemented to improve test utilization and lessons learned offered to regional partners. Antimicrobial stewardship has been supported by creation of a website on the intranet and provision of treatment algorithms for common infections. Expertise on antimicrobial stewardship will be provided to regional hospitals as part of a LIHN initiative.

PROGRAM OF LABORATORY MEDICINE

It has been an exciting and transformative year in Laboratory Medicine. With the award over 7 million dollars in capital support, we take our first steps in the process of transforming our Core, Biochemistry, Hematology and Immunology laboratories into “state of the art” high efficiency, cost effective, modern laboratories. Multiple teams and countless hours were devoted by laboratory staff in the RFP and renovation process to insure that both instruments and workflow would be optimized. We brought together frontline technologist and medical leaders from all areas. The goal was not just replacing aging equipment but to reexamine all of our processes to insure we have the latest assays, improve turnaround time (TAT), reduce costs and improve utilization. Many of the tests previously performed in specialty areas will be moved to the automated core laboratory which will improve TAT and reduce cost with the added bonus of allowing

specialty laboratories to devote more time to develop new assays.

The transformation process has also refocused our clinical laboratories future in research on test utilization, technology evaluation and knowledge transfer. We join national initiatives such as Choosing Wisely Canada to educate and improve laboratory practice and test utilization. All new electronic orders (powerplans) are now reviewed by laboratory and for the first time in decades the volume of laboratory tests has actually decreased. A committee to evaluate new tests has been established with the goal of developing a robust process for new technology and testing. Future quality improvement initiatives will target inappropriate testing or frequent repeat testing with goal in improving practice.

Laboratory transformation is an ongoing process aimed at updating instruments and improving process with overall goal of greater involvement in clinical laboratories in leading laboratory and clinical practice innovation.



Core Laboratory

Core Labs & Point of Care Testing

Core Laboratory

The Core Laboratory, where mostly highly automated fast turn-around tests are performed, operates 24 hours a day, seven days per week.

There are three Core Laboratories across the city of London: Victoria Hospital, University Hospital and St. Joseph's Hospital. These laboratories are staffed with 64 medical laboratory technologists (MLTs), 5 senior MLTs and 2 coordinators. They are supported by a team of Biochemists and Hematologists.

Core Laboratories provide initial, rapid, high volume testing and screening for all the hospital service areas (including Parkwood and Regional Mental Health) and works 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.

Quality Improvement

Several quality improvement initiatives have aimed to reduce our TAT, reduce inappropriate testing and reduce overall costs. Small changes in process of sample handling has resulted in significant improvement in TAT and cost savings. Examples include:

- Introduction of new blood gas analyzers, GEM 4000 (Instrumentation Laboratories) and by improving staff awareness of sample arrival has improved TAT for blood gases.
- TAT for cardiac troponin was also improved by releasing the initial troponin pending verification.
- Shift in workload for sample loading on analyzers to specimen receiving area Medical Laboratory Assistants has reduced the number of contact steps, resulting in an improved CBC TAT.
- Moving reticulocyte count from St. Joseph's Hospital to University Hospital, reducing the

- cost per test from \$15 to only \$3.
- Moving Cystatin C and Citrate testing from the Specialty Labs (10th floor Victoria Hospital) to the Core Laboratory improving TAT.
- To reduce the cost of quality control materials, quality control is run on the fly for the Roche analyzer, thereby reducing the number of quality control required each day and improving testing efficiency.
- Criteria required for blood film review was revised, which has resulted in a significant decrease in the number of slides reviewed by technologists and subsequently by hematologists. Automated comments based on retrospective study of our patient population with microcytic anemia have been developed. The study is currently submitted for publication.
- We have introduced combined Chemistry and Hematology Divisional Meetings on a monthly basis, bringing stakeholders together to discuss, resolve and improve shared Core Laboratory processes. Many of the simple changes in process are the result of these discussions, driven by frontline technologists and are part of the overall goal to shift the culture improvement to involve all laboratory staff.

Utilization – Choosing Wisely

- Orders for Erythrocyte Sedimentation Rate (ESR) have been reduced by introducing Cerner ordering restrictions and communicating an educational memo to physicians. This QI initiative has been published in British Journal of Quality Improvement.
- Decoupling of the INR and PTT coagulation testing in the Emergency room has reduced ordering of PTT by 45%. This initiative is now being moved to other areas in hospital.

- Decoupling of the creatinine and Blood urea nitrogen on routine orders for renal function has reduced ordering of BUN.
- Decoupling of AST/ALT liver enzymes to ALT only as part of routine orders has reduced ordering of ALT tests.
- RBC folate testing has been discontinued by the laboratory and utilization measures are in place to limit the number of samples sent to another facility for RBC folate testing to appropriate orders. Further projects are planned to ensure appropriate utilization of testing.
- Establishment of a City Wide Diagnostic utilization committee to examine frequency of testing and other utilization initiatives.

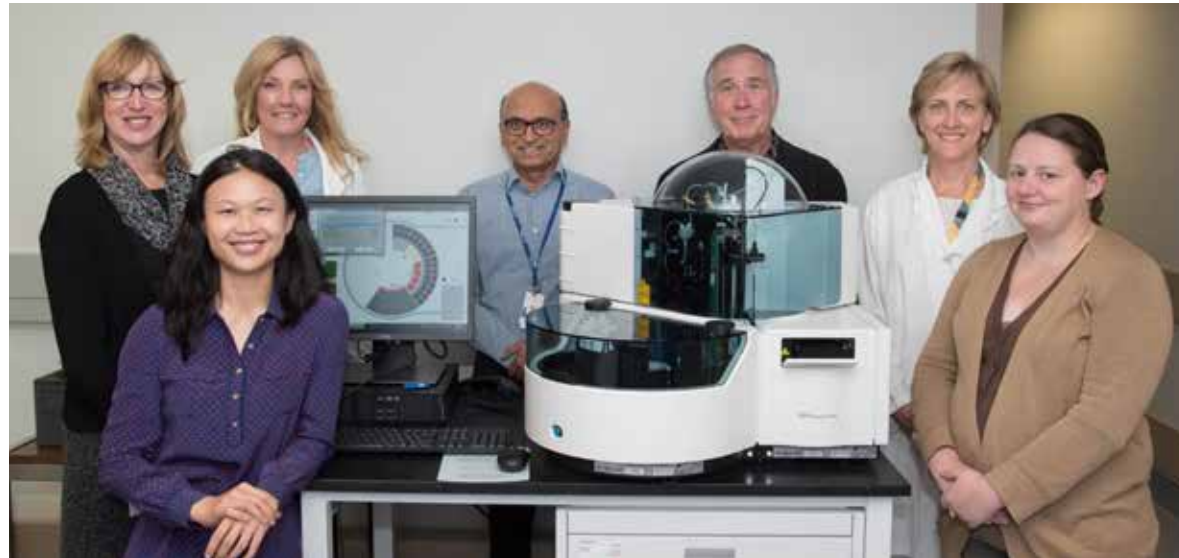
As we move forward, the Hematology and Chemistry teams will play a key role in the implementation, documentation and validation, and safety and quality initiatives surrounding the implementation of the new laboratory equipment.

Point-of-Care-Testing (POCT)

Point-of-Care testing is laboratory testing performed close to the bedside typically by certified clinical care staff. Various devices allow for Glucose, Blood gas, Urine, Occult Blood, Hemoglobin A1c and Activated Clotting Time testing across sites of LHSC/SJHC.

One of the POC Strategies has been to help improve POCT for the users. Several initiatives have helped enabled this:

- Support by a new refreshed Corporate POCT Policy to improve compliance for Accreditation.
- Improved electronic registration and reporting by interfacing with the latest implementation of



The Specialty Biochemistry Laboratories

- 22 new Clinitek urinalysis instruments.
- Improved training access and certification management with the POC website.

Over the past year, POC has seen improvements with positive patient identification. Labeled specimens are being analyzed at POC devices with the implementation of the POC Specimen Label. These changes have results posted electronically and directly to the patient's chart complete with traceability to the person doing the test. These electronic tools have also provided an improvement to the auditing processes for POC including scanning, quality control reviews, and certifications. As part of the Pathology and Laboratory Medicine hospital website, POC now has its own section which provides links to the Standard Operating Procedures (SOPs), refreshed and updated quizzes for competency requirements, as well as troubleshooting tools, located in one spot for users to access. POC has also been on the "move" with our POC mobile cart, providing an increased presence on the wards for troubleshooting, certification

assistance and the provision for distributing barcodes to the users.

There have been challenges with moving POCT forward in certain areas. In clinics with no armbands for scanning purposes, a barcoded labeled specimen is required to be able to provide POC testing. Also, some areas lack a medical directive in order to delegate POCT when necessary. Looking ahead, tools to achieve 100% patient scanning rates will allow the completion of the implementation of interfacing devices. This, combined with the continued improvement of certification processes, will help advance the POCT program.

Specialty Biochemistry

Toxicology, Therapeutic Drug Monitoring & Special Chemistry Laboratory

This laboratory performs toxicology, therapeutic drug monitoring, vitamin testing, and various special chemistry tests for LHSC, SJHC and other hospitals across the province and nationally. Drugs



Clinical Immunology

and the fat soluble vitamins are now all tested by triple quadrupole liquid chromatography mass spectrometry (LCMS). A new more advanced triple quadrupole LCMS has been acquired and plans are in the works to develop a variety of non-drug tests on this instrument. A gas chromatography-mass spectrometric (GCMS) method for plasma D-lactate has replaced the previous labor intensive method. A whole blood test for vitamin B1 is now in service. A new, Agilent Technologies FTIR spectroscopy reflectance instrument is being performance evaluated against our aging Perkin-Elmer FTIR transmission instrument; if it works well, the sample preparation hands-on time will be significantly reduced. The same company has just introduced a compact gas chromatograph on the market for use in a limited -space, -knowledge and -maintenance environment. They will be providing this instrument to the lab at no cost for a limited time, to evaluate for possible use in the newly-transformed Victoria Hospital Core Lab. In collaboration with Pharmacy, tests are being developed for Pharmacy-prepared custom drug mixtures to demonstrate they are stable for the time period of intended clinical

use. Other test development projects on various platforms are in the works also, as time and resources permit.

Clinical Immunology

The Immunology laboratory offers specialized comprehensive allergy testing for more than 200 allergens, various autoantibody testing for autoimmune diseases, quantification of various serum proteins and serum and urine protein electrophoresis. This laboratory has implemented a new instrument, Binding Site Optilite® to replace the Beckman Immage® for serum protein analysis. Validations of assays and new reference ranges on this instrument have been successfully completed and all Optilite® tests went live on January 18th, 2017. With this new instrument, we have repatriated several send-out tests including serum free light chains, C1 esterase inhibitor and IgG subclasses and thereby reduced expenses associated with these send-out tests. We have developed the criteria for autoverification of commonly ordered tests on the Optilite® that have improved work efficiencies. Currently we are in the process of validation of

pediatric reference ranges for serum proteins on the Optilite® in collaboration with the CALIPER program at the Sick Kids hospital and Binding Site.

We have completed validation and switched anti-MuSK antibody testing from a laboratory in the United Kingdom to a Canadian laboratory. Switching the referral lab for this test has led to improved TAT and reduced cost. We have developed criteria for repeat testing frequency for certain types of immunology tests and implementing the rules in Cerner to reduce or stop ordering of inappropriate tests. In addition to routine clinical services, our Immunology lab has offered 3-week lab rotation for Clinical Immunology and Allergy residents.

As part of the laboratory transformation, our immunology lab is expecting to acquire 1) a computer aided microscope for IFA testing to expand our test menu and improve the quality of services and 2) an automated capillary system for serum protein electrophoresis to improve diagnostic efficiencies.

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 technologies - High Resolution Sector Field Inductively Coupled Plasma Mass Spectrometry (HR-SF-ICP-MS).

We have developed a new website that helps to expand our business and make our laboratory competitive in the marketplace. Our laboratory meets the stringent FDA requirements for orthopedic implant performance and has been selected by another major North American orthopedic implant manufacturer as the testing site for trace metal analysis for the patients with hip implants. We are ready for a quality audit by this manufacturer scheduled in September 2017.

We have performed collaborative research with our physicians and published a paper titled "A Cross-sectional Study Measuring Vanadium and Chromium Levels in Paediatric Patients with CKD" by Filler et al., BMJ Open. 2017 Jun 6;7(5):e014821.

Endocrinology and Maternal Serum Screening

The Endocrinology and Maternal Serum Screening Laboratory offers a large menu of tests for analytes such as hormones, tumour markers, and prenatal screening markers. These are measured by a variety of immunoassay methods, both automated and manual.

Our HPLC tests for analytes such as urine catecholamines and metanephrines have been discontinued and are being referred out while work is being done to re-develop these tests on the new triple quadrupole LCMS in the Toxicology/TDM/Special Chemistry Laboratory.

Efforts are underway to decommission one of our older analyzers and transfer the tests to another platform. Consolidating testing on fewer immunoassay platforms will introduce both efficiencies in the laboratory and cost savings.

Auto verification rules in the Laboratory Information System have been introduced for a significant number of tests and will be implemented very soon for many other tests, allowing expected results to be verified automatically without the need for technologist input. This allows the technologists to better focus on results that need more attention.

The laboratory is planning to introduce new tests for calcitonin and anti-thyroid stimulating hormone receptor antibodies. Currently, samples are being sent to other facilities to have these tests done. The laboratory has also been involved in a large research project, the Water Intake Trial, with Dr. William Clark. A trial Kryptor instrument has been placed in the laboratory by Thermo Fisher Scientific to allow copeptin measurement on over 1200 samples.



Investigational Hematology

Investigational Hematology

Hemostasis & Thrombosis (HAT) Laboratory supports one of the largest regional Bleeding Disorders Programs in Ontario, providing specialty testing for patients with hemophilia and other bleeding disorders. The HAT laboratory moved from the core area to the specialty laboratories on the tenth floor as part of the laboratory transformation process. In addition we are facing the challenges of retiring senior laboratory technologist in this area and our goal for next year is to insure a smooth transition and knowledge transfer to larger group of supporting technologists.

Flow Cytometry continues its long-standing success in innovation, both nationally and internationally. We are one of two centres in Canada approved to do minimal residual disease (MRD) testing for childhood leukemia. We provide consultative services and process MRD from Vancouver to Maritimes provinces.

Technologists from flow continue to lead, present and publish at international conferences.

Transfusion Medicine

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 (SJHC). 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.

In keeping with our focus on appropriate utilizations several key quality improvement initiatives have taken place including:

- Single unit Red Blood Cell (RBC) transfusion initiative to increase single unit orders from current level of 55% to 80%. This is the number one transfusion priority for Choosing Wisely Canada. We reached this target in specific areas in Surgery and Oncology but are expanding the process to entire hospital.
- Intravenous immunoglobulin (IVIG) utilization. We continue to insure close adherence to provincial initiatives for IVIG utilization (>85% meeting approved criteria)) and dosing (>95%). A new electronic order initiative with automated dose calculation according to ideal body weight is planned to increase dosing compliance to 100%.
- Subcutaneous immunoglobulin program (SCIG). We now follow over 40 patients in SCIG program insuring appropriate utilization and monitoring for response. All new immunodeficiency patients are offered SCIG

as first choice and our eventual goal is to switch the majority of patient currently receiving IVIG for primary immunodeficiency to SCIG.

- Platelet Utilization inventory management. A new initiative to shift product locally between our sites has reduced platelet outdates
- New technology implementation – Collaboration with anesthesia and cardiac surgery to bring Thromboelastography to laboratory to monitor and guide blood product utilization in cardiac surgery.

Transfusion Education

Education of hospital staff is major focus for Transfusion Medicine with goal of improving utilization, improving reporting of adverse reactions and hemovigilance. A course called Blood Transfusion Safety has been developed as series of electronic, iLearn, modules.

- Module 1: Pre-Transfusion Specimen Collection
- Module 2: Safe Blood Administration Practices
- Module 3: Managing and Reporting Transfusion Reactions

The goal is for staff to complete one module each year (beginning in 2016) on a 3 year rotation.

Transfusion Research

- Participation in multicenter trial comparing Cryoprecipitate versus fibrinogen replacement, the FIBRES study, in cardiac patients.
- Participation in multicenter trial evaluating the clinical outcome of fresh blood vs standard issued blood in critical ill pediatrics – ABC PICU study

Transfusion medicine is looking forward to recruitment of a new Transfusion Medicine specialist in 2017. The



Transfusion Medicine



Transplant Laboratories

new recruit will specialize in Knowledge Transfer (KT) and will hopefully continue to work to improve utilization of blood products in accordance with current clinical guidelines as well as support KT initiatives within the laboratories in general.

Transplant Immunology

The Transplant Immunology lab had a very successful inspection by the American Society of Histocompatibility and Immunogenetics (ASHI) on Jun 9th, 2017. The inspector came from Henry Ford Hospital, Detroit Michigan. After a very thorough audit-based inspection, no deficiencies were found and no recommendations were made. ASHI has the most stringent and comprehensive standards regarding clinical testing for histocompatibility and immunogenetics. Lab accreditation by ASHI is a very extensive peer-review process, and is considered to be the best practice internationally.

The laboratory continues to make improvements in quality and service. Our TAT for high resolution

typings for hematopoietic stem cell transplants is much shorter than the provincial average.

We have initiated pre-transplant HLA testing for liver transplants, routine post-transplant DSA monitoring for heart and kidney/pancreas transplant, and HLA Typing for pediatric hematopoietic stem cell transplants. Our test volume continues to increase and has increased substantially over the past year. Continuous streamlining and overall process improvement has kept us on track with our operating budget.

There are new technologies to provide faster, better, and more cost-efficient services for transplant patients. The main challenges for the Transplant Immunology lab involve keeping up with the quickly-evolving technologies as they impact capital equipment and staff training.

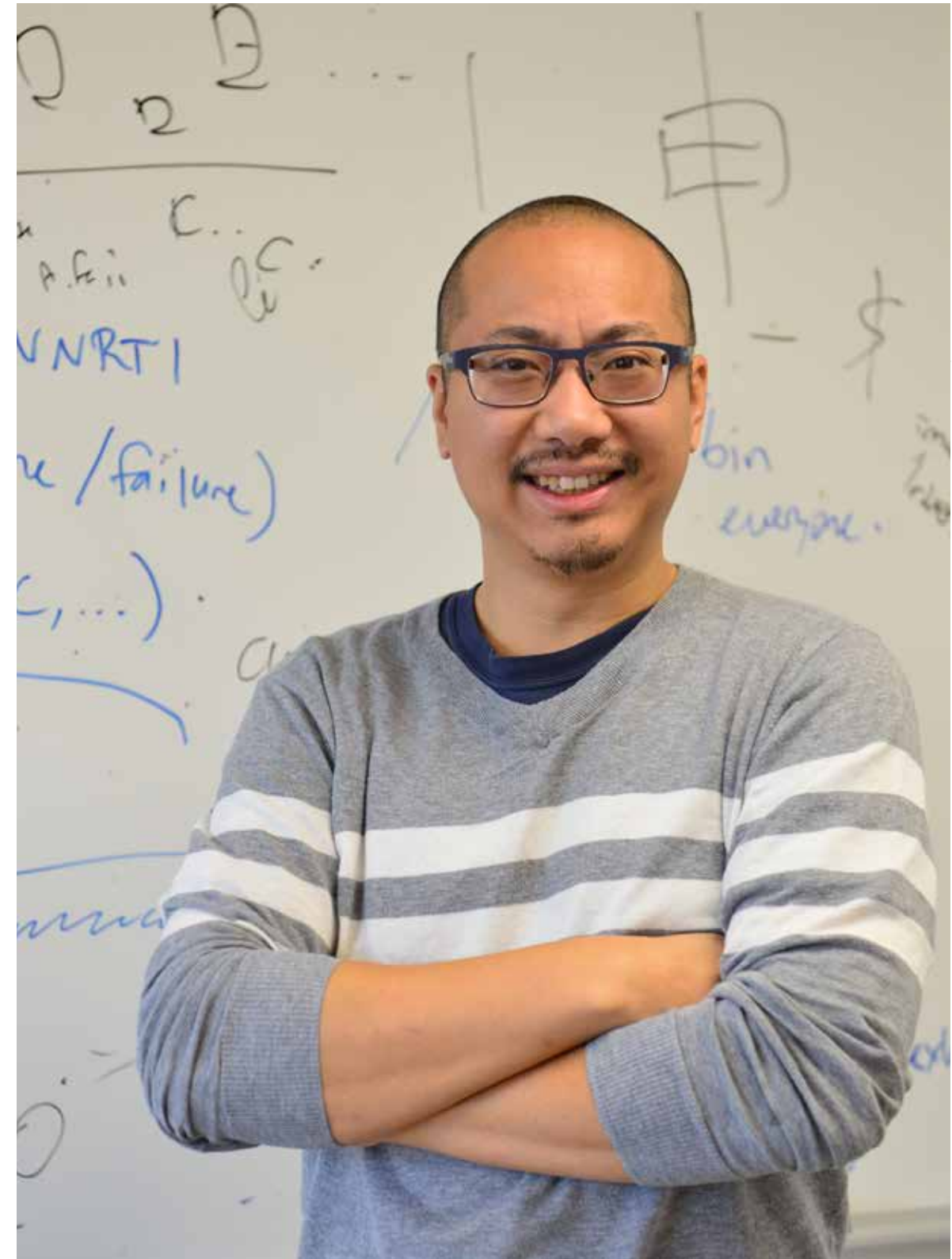
Research **SPOTLIGHT**

Dr. Art Poon has over 15 years of research experience in bioinformatics, phylogenetics and the study of virus evolution. He completed an MSc in mathematical biology with Dr. Sarah Otto at the University of British Columbia and a PhD on the experimental evolution of bacteriophages with Dr. Lin Chao at the University of California, San Diego. Dr. Poon continued at UCSD as a postdoctoral fellow at the Antiviral Research Center with Dr. Simon Frost, where he became a major contributor to the development of HyPhy, a popular software applications for phylogenetic analysis with over 10,000 registered users and 8,000 citations in the peer-reviewed literature. He was responsible for building the machine learning toolbox in HyPhy, which has been used over 8,000 times for detecting the coevolution of amino acids in proteins.

In 2008, he moved to the BC Centre for Excellence

in HIV/AIDS (CfE) as a CIHR Postdoctoral Fellow and eventually became Senior Scientist (Bioinformatics) at this centre, leading the development of the clinical next-generation sequencing pipelines. At the CfE, he built the world's first "real-time" HIV transmission monitoring system, which led to the publication of an implementation case study in *The Lancet HIV* and is still used to guide provincial public health decisions for HIV prevention.

In 2016, Dr. Poon became a tenure-track assistant professor at Western University, where he is establishing an independent research program for developing and applying new computational methods for the study of virus evolution. He was the recipient of a Scholar Award from the Michael Smith Foundation, and is the recipient of a CIHR New Investigator Award.



Dr. Art Poon

Research REPORT

“The Department of Pathology & Laboratory Medicine faculty members have expertise in a broad array of basic, translational, and clinical research.”



Dr. Zia Khan

Research overview

The Department of Pathology & Laboratory Medicine is an integral part of the vibrant Western research enterprise. Our faculty members have expertise in a broad array of basic, translational,

and clinical research. Areas of research, where we excel, include cardiovascular biology, cancer biology, immunology/inflammation, neuropathology, environmental pathology, regenerative medicine, and education. Most of these research areas are also designated as areas of excellence at Schulich Medicine & Dentistry. In the past few years, we have seen diversification of our research expertise through new appointments and recruitments. We have added new elements/research expertise to our repertoire, while strengthening the established ones. In essence, we mirror a miniature Schulich School of Medicine & Dentistry.

As we all know, the research funding environment has undergone major changes in the past few years. Two mechanistic changes in research funding have really challenged researchers at all career stages. First, research granting agencies (CIHR, NSERC and SSHRC) have not kept pace with inflation, a significant increase in the number of research faculty, as well as enhanced pressure to increase research trainee enrolment. Second, we

have seen a shift by the funding agencies towards research that is more collaborative in nature and one that demonstrates a direct economic impact. Despite these challenging times, we have much to celebrate. Our members have continuously been successful in securing external funding. Just over the last year, our members have received funding from the Canada Foundation Innovation, Leaders Opportunity Fund (Dr. Martin Duennwald), Canadian Diabetes Association (Dr. Subrata Chakrabarti), NSERC Discovery grants (Drs. Martin Duennwald and Joan Knoll), the Kidney Foundation of Canada grant (Dr. Zhuxu Zhang), Schulich Collaborative Research Seed Grant (Dr. Sunil Parapuram), and PSI Foundation Resident Research Grant (Dr. Matthew Cecchini), to name a few. Moving forward, we need to capitalize on the critical mass of excellent researchers in the department, as well as across Western, to create new collaborations and adapt to the changing research ecosystem.

Our large group of investigators enjoy numerous opportunities for interaction through informal discussions, frequent and alternating Dr. Robert Zhong Research Seminars and Grand Rounds, and our Annual Pathology and Laboratory Medicine Research Day. The research day is noteworthy because it has certainly become a day to acknowledge and celebrate our research accomplishments. We have continued to invite inspiring, high-profile speakers to deliver the keynote address. Consequently, the keynote address was renamed the Paterson Lecture in memory of Dr. James Charteris Paterson, a Professor in the

Department of Pathology at Western from 1965-1972. Dr. Paterson and Dr. John Fisher established the initial departmental research programs leading to MSc and PhD degrees in basic medical sciences. For our 2016 research day, we had the pleasure of hosting Dr. Andrew Fire to deliver the Patterson Lecture. 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”.

Our excellence in research and training has attracted outstanding faculty, postdoctoral scholars, and graduate students. We continue to advance the understanding of disease, and enhance the reputation of our department, Schulich Medicine & Dentistry, and Western. As we look ahead, our challenges remain the same as last year and the year before. We need to adapt to the dwindling research funding, by embracing and enhancing a collaborative approach to the production of new knowledge. The department is preparing for a strategic plan facelift and mechanisms to enhance research collaboration will, undoubtedly, be at the forefront. Our researchers are a resilient group and hopefully soon we will not have to identify research funding as a challenge.

RESEARCH FUNDING STATISTICS

EXTERNALLY FUNDED (PI)
\$1,350,000

EXTERNALLY FUNDED
(CO-PI/CO-INVESTIGATOR)
\$4,500,000

TOTAL GRANT FUNDING HELD
\$6,285,000

INTERNALLY FUNDED (PI)
\$410,000

INTERNALLY FUNDED
(CO-PI/CO-INVESTIGATOR)
\$25,000

TOTAL PUBLICATIONS
(FULL LIST BELOW)
132

Department
PUBLICATIONS

Publications July 1, 2016 to June 30, 2017

1. Abulizi P, Loganathan N, Zhao D, Mele T, Zhang Y, Zwiep T, Liu K, **Zheng X. Growth Differentiation Factor-15 Deficiency Augments Inflammatory Response and Exacerbates Septic Heart and Renal Injury Induced by Lipopolysaccharide.** Sci Rep. 2017 Apr 21;7(1):1037. DOI: 10.1038/s41598-017-00902-5. PMID: 28432312.

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