ANNUAL REPORT **2018**

Pathology and Laboratory Medicine

Pathology and Laboratory Medicine:
seeing small, thinking big

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Message from **THE CHAIR/CHIEF**

Dr. Subrata Chakrabarti

We are proud of our achievements this past year and enter the new year with a high degree of enthusiasm for continued excellence. Our achievements were only possible through the exemplary engagement of all departmental members: faculty, staff and trainees.

2018 was a year of firsts for our Department:

- We completed an integrated strategic planning process that aligns our priorities across hospital and university operations. This would not have been possible without your unprecedented engagement.
- We completed the Laboratory Medicine Transformation Project. Our acquisition and implementation of state-of-the-art instrumentation will allow us to provide improved diagnostic testing to internal and external community partners.
- We made significant progress regional with initiatives.
- We launched a new program in One Health and welcomed Dr. Francisco Olea-Popelka as the Beryl Ivey Chair of One Health.

Beyond our many significant firsts, we continued to demonstrate excellence in teaching, research funding and publications.

In 2019, we will begin the implementation of our strategic priorities and actively live our plan. We will also complete the Pathology Transformation and Microbiology Transformation projects, which are currently well underway.

Our collective achievements are only possible because of your participation. I feel honored to be a member of Pathology and Laboratory Medicine and thankful to everybody for their contributions and commitment. I am sure we will continue improving patient care, along with strong contributions to knowledge creation knowledge creation, education and dissemination.

Best wishes,

Subrata Chakrabarti.

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

Departmental **MISSION, VISION, VALUES**

We are an integrated and collaborative team of faculty, staff and learners achieving excellence in knowledge sharing, knowledge creation and patient care.

MISSION

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 strong research 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.

VISION

To be the cornerstone of the patient journey, uniting our teams in the pursuit of transformational knowledge, quality improvement and healthcare excellence.

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.

About
PATHOLOGY AND LABORATORY MEDICINE

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

Translational Department

The Department is unique and complex, comprised of a basic science research department located at the Schulich School of Medicine & Dentistry, Western University and a large clinical department located city-wide within the London hospitals. This structure allows us to be an effective conduit and facilitator of multidisciplinary and translational research, and cross-disciplinary teaching initiatives.

A snapshot of our department, at January 2019

Founded: 1945

Chair/Chief: Dr. Subrata Chakrabarti

2018-19 Total Grant Funding: $7,143,854

Publications: 119

Strategic Planning Meeting Group Shot 2018

The Department at a Glance

at January 2019

57
Full-time Faculty

416
Hospital Staff

34
Adjunct Appointees

19
Residents and Fellows

14
Cross Appointees

55
Graduate Students

6
Full-time University Staff

19
BMSc Undergraduate Students

Departmental **HIGHLIGHTS**

WELCOME NEW FACULTY

December 2017 – Michael Knauer, PhD, FCACB, Clinical Biochemist, Assistant Professor

June 2018 – Michael Payne, PhD, Medical Microbiologist, Assistant Professor

August 2018 – Ana Cabrera, PhD, FCCM, Clinical Microbiologist, Assistant Professor

September 2018 – Dr. Lienna Zhao, MD, PhD, FRCPC, Pathologist, Assistant Professor

January 2019 – Dr. Francisco Olea Popelka, DVM, PhD, Associate Professor, Beryl Ivey Chair in One Health

January 2019 – Dr. Rebekah Jacques, MD, FRCPC (AP & FP), Assistant Professor

CONGRATULATIONS TO OUR LONG SERVICE AWARD RECIPIENTS

10 Years

Dr. Nancy Chan - Pathology Program

Dr. Manil Gabril - Pathology Program

Dr. Jose Gomez - Pathology Program

20 Years

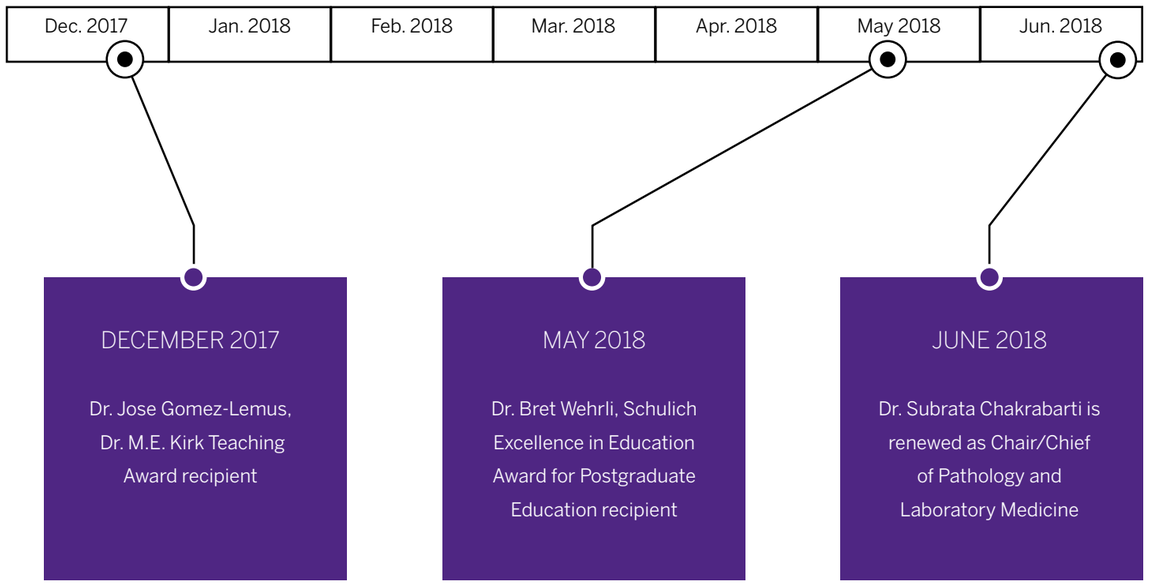
Dr. Edward Tweedie - Pathology Program

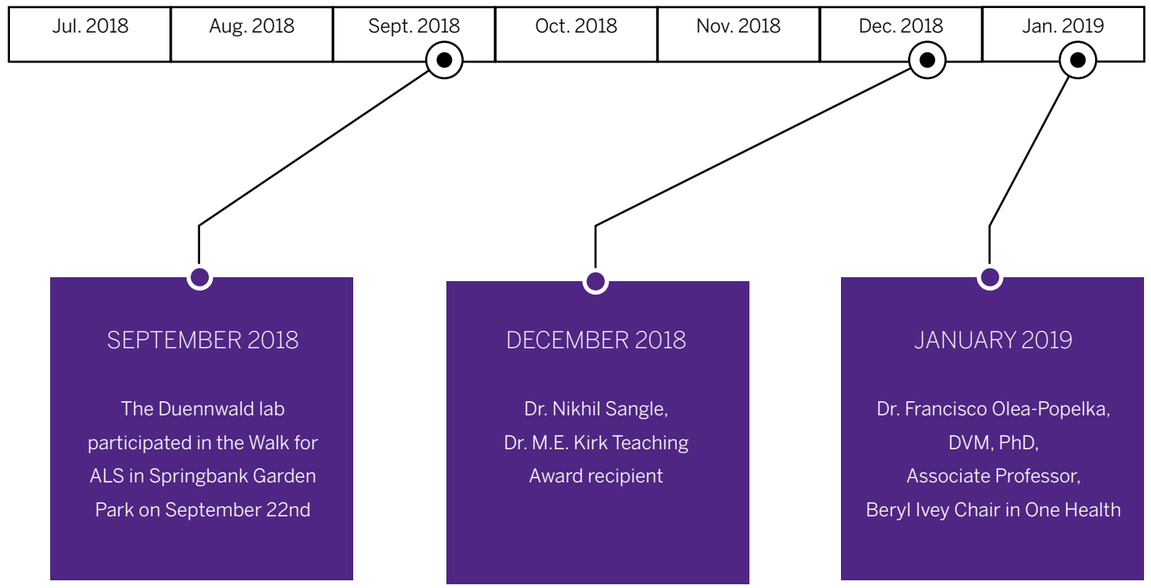
30 Years

Dr. Carolyn McLean - Pathology Program

35 Years

Dr. Tony Rupar - Pathology Program





AWARDS AND HONOURS

December 2017 – Dr. Jose Gomez-Lemus, Dr. M.E. Kirk Teaching Award recipient

May 2018 – Dr. Bret Wehrli, Schulich Excellence in Education Award for Postgraduate Education recipient

May and June 2018 – Dr. Bertha Garcia, Dean's Award of Excellence (Lifetime Achievement) recipient

June 2018 – Dr. Bertha Garcia, Leadership in Education Award recipient from the Canadian Association of Pathologists

November 2018 – Dr. Vipin Bhayana, 2018 Lifetime Achievement Award recipient from the Ontario Society of Clinical Chemists

December 2018 – Dr. Nikhil Sangle, Dr. M.E. Kirk Teaching Award recipient

RETIREMENTS

May 2018 – Dr. Michael John, after 23 years of service

June 2018 – Ms. Mair Hughes, after 20 years of service

August 2018 – Ms. Laurie Floyd retires after 40 years of service.

September 2018 – Dr. Carolyn McLean retires after 31 years of service.

December 2018 – Dr. Alan Tuck, after 22 years of service

COMMITMENT TO THE COMMUNITY

September 2018 – The Duennwald and Shaw labs joined forces to support WALK-IT for Parkinson's at Springbank Garden Park.

September 2018 – In addition to helping organize the event, the Duennwald lab participated in the Walk for ALS in Springbank Garden Park.

December 2018 – Food Drive Challenge – Another year of success! Our department was once again the winner of the Food Drive Challenge. This year we were able to donate more than 3,000 pounds of food to support the London Food Bank. Our Department accounted for more than 75 percent of the total donation made by LHSC this year.

December 2018 – This was the sixth year that our Department has volunteered to prepare, cook and serve meals for families staying at the Ronald McDonald House. Our annual Toy Drive provided more than 100 gifts to the Christmas Room for children staying at the Ronald McDonald House.

Departmental **LEADERSHIP**

Dr. Subrata Chakrabarti

Chair/Chief

Appointed Chair/ Chief in 2011, he is respecively accountable to Western University and the London Health Sciences Centre and St. Joseph's Health Care London.

Dr. David Driman

Director of Education

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

Dr. Zia Khan, PhD

Director of Research

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

Dr. Ian Chin-Yee

Program Head Laboratory Medicine

Appointed Program Head, Laboratory Medicine in 2016 and oversees activities of Immunology & Biochemistry, Transplant Immunology, London Health Sciences Centre Pulmonary Function and Hematology.

Dr. Meg McLachlin

Program Head Pathology

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

Academic **ORGANIZATION**

UNDERGRADUATE EDUCATION

Undergraduate Bachelor of Medical Sciences

Lisa Cameron
Undergraduate Chair

Undergraduate Medicine

Ted Tweedie
Medicine 1 & 2 (Interest Group)

Mariamma Joseph
Medicine 3 (Pathology Case Conference)

Michele Weir
Medicine 1 & 2 (New Curriculum)

Helen Ettler
Medicine 3 & 4 (Electives/Selectives)

Undergraduate Dentistry

Mark Darling
Coordinator

GRADUATE EDUCATION

Research Based Graduate Programs

Zia Khan
Graduate Chair

Masters of Clinical Sciences PA 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

Cady Zeman-Pocrnich
Program Director

Novel Education Resource Development

Michele Weir
Coordinator

ADMINISTRATIVE SUPPORT

Rachel Halaney
Manager, Administration & Finance

Kayla Anderson
Finance Assistant

Cheryl Campbell
Education Coordinator, Undergraduate & Postgraduate

Tracey Koning
Education Coordinator, Graduate Programs

Linda Jackson
Departmental Technician

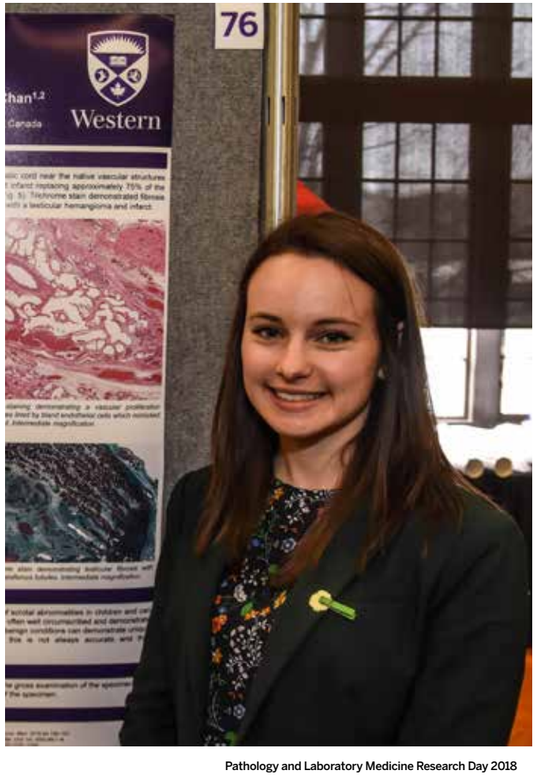
Kathilyn Allewell
Media Specialist

Susan Underhill
Administrative Assistant

Education
OVERVIEW

Message from the Director of Education
Dr. David Driman

Education remains a top priority and focus of the Department. By many measures, this is reflected in how attractive the courses and programs are to potential students, and by outcomes within courses and programs. Many of the Department's 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.



Pathology and Laboratory Medicine Research Day 2018

Undergraduate
EDUCATION

Undergraduate Bachelor of Medical Sciences

The undergraduate Bachelor of Medical Science (BMSc) modules experienced excellent growth in 2018. This past year, we welcomed and graduated 16 Pathology honors specialization students, two honors students each from our combined modules with Microbiology and Immunology and Computer Science, and 12 students in the Major module. The number of students in our programs has steadily increased from five honors students in 2009 to 20 in 2017. We also welcomed 20 honors students for the 2018-2019 academic year. Although our enrollment numbers are saturated for Honors Specialization in Pathology, we are anticipating further growth in the new interdisciplinary program in One Health.

Our BMSc program in Pathology held its cyclical program review on March 9, 2018. Drs. Doug Templeton (University of Toronto), Christopher Nicol (Queen's University), and Margaret McNay (Western University; internal) met with a number of our department members and submitted their report to the Subcommittee on Program Review – Undergraduate (SUPR-U). Among various other positive aspects, the reviewers noted our program-level outcomes and their alignment with both Western and BMSc Degree Outcomes. Reviewers also commented on students reaching Mastery level in most of the program-level outcomes, with the remainder reaching, at least, the Reinforcement level. Most importantly, the reviewers were impressed with the "*overwhelming appreciation by our students for the effectiveness and quality of program content to help hone their skills for their future careers"*. SUPR-U recommended our program in GOOD STANDING to the Senate Committee on Academic Policy and Awards (SCAPA). We are delighted that this recommendation was approved by SCAPA.

As we look to the future, we have excellent opportunities to enhance our undergraduate training program. We have been successful in recruiting a new Beryl Ivey Chair in One Health, Dr. Francisco Olea-Popelka; he is an internationally known One Health researcher and will oversee the One Health Honors Specialization Program. Dr. Patti Kiser, and Stephanie Frisbee are also developing two new courses for our One Health Honors Specialization Module. Our Honors Specialization program in Pathology is also enhanced by the participation of faculty from the clinical arm of Pathology and Laboratory Medicine. Feedback from students involved in clinical research projects has been excellent. Overall, our undergraduate BMSc training programs show an excellent trajectory for the foreseeable future.

Dr. Zia Khan's Bachelor of Medical Science Group

Undergraduate Dentistry

In the Schulich Dentistry curriculum, instruction in general and systemic pathology are introduced in the first year. Five full courses in pathology and oral pathology were offered to undergraduate and postgraduate dental students in 2017-18. Oral Pathology was instructed in the first, second and third 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 precent pass rate for all courses, generally with average grades in the mid-70s to low 80s. Interest in Oral Pathology appears to peak in the third dental year, perhaps due to methods of delivery and the emphasis on content such as common conditions, outside of tooth related pathology. Courses are delivered both online through Sakai OWL, and as hands-on laboratory instruction using a problem-based approach, encouraging student participation in discussion. The use of virtual microscopy (introduced and developed by Dr. Christina McCord) in the Oral Diseases laboratory courses will be expanded.

Schulich Dentistry underwent accreditation in 2017. There have been subsequent minor changes/improvements to the Oral Diseases curriculum, particularly with respect to Oral Diseases 1. Dr. Darling serves on the Curriculum Committee for Undergraduate Dentistry and will participate in curriculum development initiatives.

Looking ahead, some issues with the current Oral Pathology curriculum may need to be addressed in anticipation of curriculum modernization. The fragmented delivery of topics has been addressed to some degree, but further improvements are expected, in order to streamline the subject matter to be more meaningful for students. Future plans include continuing to develop online learning through the OWL online course management system, and increased use of virtual microscopy.

Undergraduate Medicine Education (UME) in Pathology

We want to elevate the visibility of Pathology and Laboratory Medicine to medical students 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 the transition to residency. We will participate in the renewed UME curriculum transformation and Competency-based Medical Education (CBME) activities guided by Dr. Gary Tithecott and his team.

Present UME Education Activities (Medicine 1 - Medicine 4):

All activities related to UME in Pathology (Medicine 1-4) are progressing well. We have completed two "Pathology Interest Group" sessions for Medicine 1 and 2, which were organized by student interest group coordinators.

Our faculty provided four Medicine 3 pathology case conference seminars during the past year. Our pathology residents, under the leadership of Dr. Matt Cecchini, 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 students.

We offered Pathology Electives to a number of medical students

Pathology Research Day 2018 Group Photo

from Western and external universities as part of Meds III and IV Clinical Clerkship. We included many junior faculty members as supervisors and revised the booklet/guide to be used by supervisors and students. The "Resident Buddy System" for Med 3 & 4 selective/elective students is working very well in our department; the teaching and mentoring initiatives from our residents were highly complemented by the students.

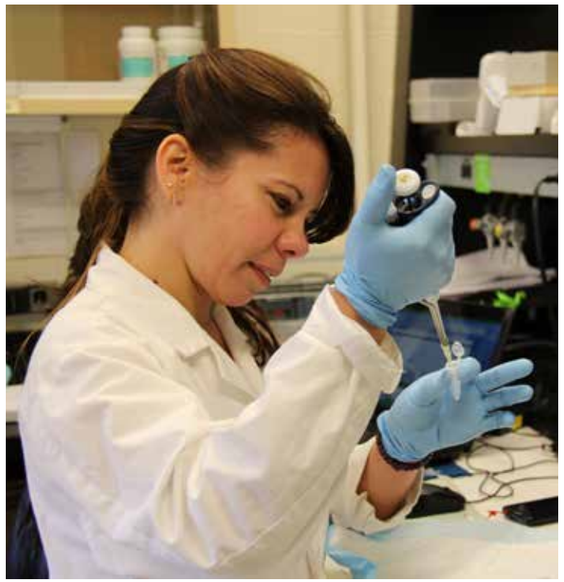
Dr. Joseph participates in the UME Clerkship Review Committee chaired by Dr. Kent Stobart, Vice Dean of Education at the University of Saskatchewan and Dr. Kevin Fung Chair/Chief, Department of Otolaryngology - Head and Neck Surgery, Schulich School of Medicine & Dentistry, Western University.

Future UME Activities:

The Schulich School of Medicine & Dentistry is actively engaged in UME curriculum renewal efforts. The goal is to develop a more fully coherent, coordinated and integrated curriculum to foster lifelong learning. CBME is built into this new curriculum. Reports on UME CBME updates are available to faculty through periodic bulletins from Dr. Gary Tithecott. Schulich UME will be using the recent 12 AFMC approved EPAs as the foundations of assessment of competency across all four years of the curriculum. Dr. Michele Weir represents our Department at the UME level and she has organized multiple CPD sessions for our faculty and students on CBME principles.

Development of the Foundations course has recently started and will include integrated foundational material for basic and clinical sciences. For Principles 1 and Principles 2, preliminary development work has started; consultations are underway for the "Foundations of Medical Care" block.

Graduate Students at PaLM Research Day 2018



Ana Pipetting

In order to encompass the exciting and challenging needs of this new curriculum, we expanded and restructured the existing departmental Undergraduate Medicine Education Committee as follows: Dr. Mariamma Joseph, Chair; Dr. Michele Weir and Dr. Joanna Walsh (representing Medicine 1 & 2 curriculum), Dr. Edward Tweedie (representing Medicine 1 & 2 interest group), Dr. Mariamma Joseph and Dr. Matt Cecchini (Medicine 3 pathology case conference), and Dr. Helen Ettler (Medicine 3 & 4 electives/selectives). In addition, a small subcommittee encompassing select faculty members and residents was formed in order to plan and oversee the upcoming curriculum related activities.

Looking Ahead:

We have a group of dedicated teachers and education leaders in our department. CBME implementation needs commitment, planning and action. Although challenging, we are committed to introducing novel ideas and approaches to Pathology and Laboratory Medicine teaching . As we move forward, we will continue to implement CBME as part of curriculum realignment at the UME level.

Graduate **EDUCATION**

Graduate Student Orientation 2018

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 throughout 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 14 PhD students and 21 MSc students in our research-based program.

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

The MCISc Pathologists' Assistant program had six students graduate in 2018. All six students began working full time as pathologists' assistants in Ontario before convocation, with two joining our team at London Health Sciences Centre.

MCISc-PA Program Cake and Tea Celebration

The PA program underwent the Institutional Quality Assurance Process review, with external reviewers visiting our department in November 2017. Final documentation was submitted and approved by the School of Graduate and Postdoctoral Studies at Western University in early 2018.

There were many achievements this year. Six second year students presented nine posters at the department's annual research day. Prizes for outstanding research were awarded to Alyshia Philips and Erika Chadwick. Students also presented their posters at the Canadian Association of Pathologists meeting in Quebec City in July 2018. Nicole Smith and Alyshia Philips represented Western as student delegates and showed their case reports at the American Association of Pathologists Assistants Association meeting in New Orleans in September 2018. Phillips and Smith were also awarded the Dr. Subrata Chakrabarti Pathologists' Assistant Graduate Award as top graduating students.

Two of our alumni have become new PA preceptors in our program this year. Stephanie Sharpley has joined Andrew Zhang as a teacher, preceptor and role model for students at London Health Sciences Centre, while Steffi Stephenson has taken on the same role at the Hospital for Sick Children in Toronto. Steffi also returned to Western to present a seminar "Preparing for the ASCP Pathologists' Assistant Board Examination" in June.

We continue to be a competitive and sought after program. More than 140 applications were received for only six seats for the new September class. The top six ranked qualified applicants receiving offers of admission all accepted, and have joined the program.

Pathology Research Day 2018 PA Group Photo

Postgraduate **EDUCATION**

Anatomical Pathology Resident Training Program

The Anatomical Pathology Residency Program has had many accomplishments in 2017-18, and continues to produce well trained residents who go on to have productive careers.

We have a full cohort of residents (11 total in Postgraduate Year (PGY) 1 - Postgraduate Year (PGY) 5). 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 service. Several residents have been particularly innovative, incorporating pathology into various social media platforms.

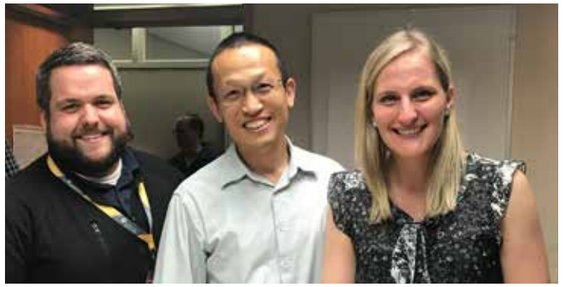
Successes over the past year have included:

- Successful completion of the Royal College examination by the PGY5 residents (continuing a 28-year perfect pass rate).
- Implementation of an Introduction to Pathology rotation for PGY1.
- Successful, well attended Resident Research Day.

Looking ahead we are preparing to transition to Competency-based Medical Education in collaboration with the Royal College, scheduled for July 2019. As well, the Anatomical Residency Program will undergo an internal review in November 2019.

Neuropathology Resident Training Program

As the Neuropathology Residency Training Program approaches its fiftieth year, it continues to accept both Canadian and foreign medical graduates, including international sponsored residents. This policy partly reflects the shortage of Neuropathology posts in Canada for qualified Canadian neuropathologists and concurs with internationalization initiatives of Western University and the Schulich School of Medicine and Dentistry.



Drs. Matt Kubica, Qi Zhang and Emily Goebel

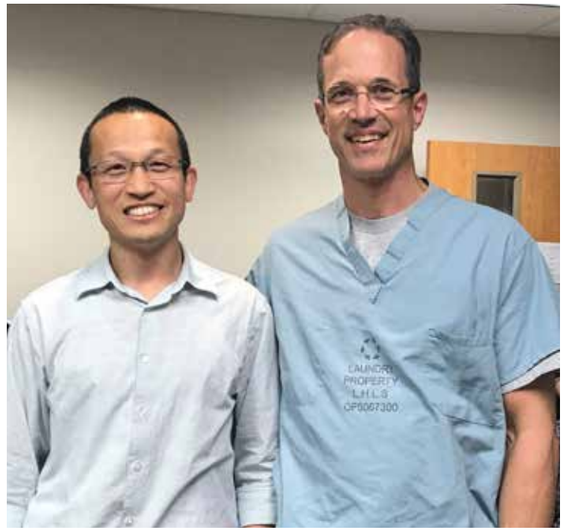
Internationally-sponsored residents are self-funded and come with the understanding that they will return to their sponsoring institutions at the completion of training. We provide elective periods for Residents from other Training Programs (Neurosurgery, Neurology and Anatomical Pathology) and we offer post-residency Fellowship training for Canadian and International fellows on a case-by-case basis, based partly on the availability of funding.

Current trainees include one Canadian medical graduate (Dr. Kris Langdon, PGY5) and one internationally sponsored resident (Dr. Basma Alyamany). We were offering a position through the CaRMS match in the 2018/19 match.

This core complement of trainees was supplemented in 2017/18 by 13 elective blocks, primarily from other Western Residency Training Programs (six from Neurology, four from Neurosurgery and three from Anatomical Pathology), as well as five medical student observerships and 4th year electives.

2018 Paterson Lecture given by Dr. Randy Schekman

Two full-time faculty Neuropathologists (Dr. Lee Cyn Ang and Dr. Rob Hammond) are involved in the program. Two colleagues, Dr. David Ramsay and Dr. Qi Zhang are in part-time roles. The day-to-day training and education of Neuropathology residents and off-service trainees is greatly enhanced by the efforts of the senior Neuropathology residents and the clinical fellows.

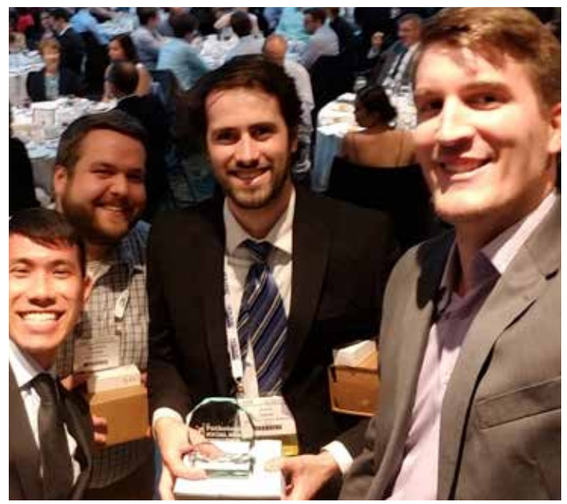


Neuropathologists Dr. Qi Zhang and Dr. Rob Hammond

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.

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



CAP Meeting Award Recipients

Advanced **TRAINING**

ADVANCED TRAINING

Surgical Pathology Fellowship Program

The Surgical Pathology Fellowship program remains a sought-after program for residents who are coming out of training in Canada. On average, there have been approximately three times the number of applicants as there are available positions. Typically, there are one or two positions per year; one position if there is a concurrent cytopathology fellow. Strengths of the program include the exceptional quality of teaching staff in the department, the volume of material available for learning, a pleasant and agreeable learning environment and the external recognition received as a result of the Schulich School of Medicine & Dentistry being known as a desirable location for fellowship training in Pathology. Current challenges with the program lie in the on-going threat of a reduction in funding sources.

There was one fellow in the Department in 2017-2018, but they were unable to complete their training due to the acceptance of a full-time staff pathologist position.

Area of Focused Competence (Diploma) in Cytopathology

The Area of Focused Competence (AFC) team has had a busy year training our third candidate. We will be welcoming a new candidate, Dr. Qi Yang from the University of Manitoba, in July 2019. We expanded our team and welcomed Dr. C. Zeman-Pocrnich, our prior AFC trainee to our cytopathology faculty supervisor team, as well as a Stratford clinician to our fine needle aspiration biopsy clinical supervisor team. The team is taking a much-needed break from training for 2018-19, so we will not have a candidate for the academic year.

The team trained our third candidate, Dr. Nicole Delaney from the University of Calgary, who finished the program in June 2018, and we await the Royal College of Physicians and Surgeons of Canada's decision of her e-Portfolio submission. This was our first trainee from outside of our program, and we will update the program to include some orientation features to support our future external trainees. As with any new curriculum, there have been minor changes to the training documents from the Royal College of Physicians and Surgeons of Canada and we have updated our program accordingly. We successfully migrated to on-line electronic tools on One45 to minimize paperwork, and used an electronic logbook summation through our Cerner system to reduce trainee and program director time.

We participated in a visit from an external departmental head and his team this year who were interested in implementing an AFC in Cytopathology in their pathology department. Our AFC team showcased our model, documents and tools and received positive feedback on our accomplishments. In addition we have provided support to a new AFC program at Schulich School of Medicine & Dentistry, Western University by sharing our documents, tools and lessons learned from our build and implementation. We anticipate ongoing work through the upcoming year as we prepare for our first Royal College external review in November 2019.

Continuing **PROFESSIONAL DELOPMENT**

Multi-header Microscope Workshop 2018

Continuing Medical Education Events

Advances in the Practice of Cytopathology

Advances in the Practice of Cytopathology with Bedard Lectureship in collaboration with Mt. Sinai Hospital took place on October 21, 2017 at University Hospital, London Health Sciences Centre, with many speakers from Western included in the lineup.

Cancer Care Ontario Educational Event

American Joint Committee on Cancer 8th Edition: What's new in cancer reporting? A Schulich School of Medicine & Dentistry, Western University and Cancer Care Ontario Program took place in March 2018. This collaborative half-day event took place at Spencer Hall and was designed to meet the learning needs of community pathologists. Six local faculty presented, and were given excellent feedback from attendees.

Multi-header Microscope Workshops

The Department of Pathology and Laboratory Medicine continued the series of multi-header microscope workshops for community pathologists. Successful workshops were held in the fall of 2017 and 2018. Feedback from attendees continues to be excellent. The last workshop was a full day event with optional morning attendance and was our best attended workshop to

2018 Workshop Participants

Grand Rounds

Pathology and Laboratory Medicine Grand Rounds were held quarterly, hosting a variety of interesting local and international 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 Educational Resource Development working group is going to continue to provide a speaker for one grand rounds spot per year in order to reach a larger audience with our departmental educational plan. Three speakers have been confirmed for the 2018/2019 dates.

Date	Presenter	Title
September 21, 2017	Amanda Moehring Associate Professor, Department of Biology, Western University	Imposter Syndrome: How to Keep Self-Doubt from Sabotaging Your Success
November 9, 2017	Dr. Kathryn Roth Assistant Professor, Department of Otolaryngology, Schulich School of Medicine & Dentistry	The Road to CBME: Lessons from Otolaryngology
April 19, 2018	Dr. David Viswanatha Associate Professor of Laboratory Medicine and Pathology, Mayo Clinic, Rochester, MN	Molecular Diagnostics of Hematologic Neoplasms: Next Generation Sequencing and Next Generation Challenges

Novel Educational Resource Development (NERDs)

The NERDs group is an educational interest group which was created from our Strategic Direction Retreat in 2014, and provides resources, a community of practice for teaching, and education scholarship and leadership for our department. The group builds resources for novel learning techniques as well as scholarships in education for faculty and learners.

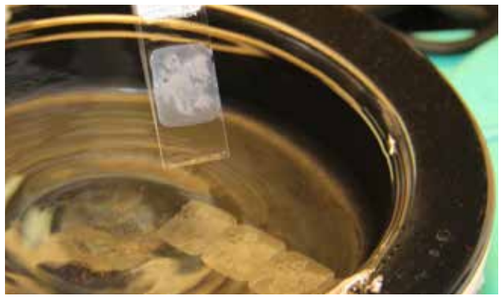
During the past four years we have created resources for enhancing faculty and learner development of educational skills; and building a community of practice for sharing successes, experiences and challenges. We have built on-line resources on our OWL website with links to Western University Teaching Support Centre, Schulich CPD and the Royal College of Physicians and Surgeons. Website activity includes more than 400 visits and 40 users, with the resources section being the most active tool accessed.

Our open forums have continued over the academic year and topics included coaching and feedback, Competency-based Medical Education (CBME), UME Curricular renewal update, Flipped Classroom, and Technology & Techniques for Pathology and Laboratory Medicine teaching. NERDs sponsored a Grand Rounds session on lessons learned from CBME Implementation. New this year, our open forum audience includes our technologists and administrative leads.

Our impact has included a growth of scholarship in education, with posters, presentations and workshops at departmental and national research forums and conferences. There has been increased use of new techniques and technologies in our teaching activities. Additionally, there have been education related publications, learner interest in educational scholarship, and our technologists' seminars have had some educational topics. Future direction for the upcoming year includes another Grand Rounds session sponsored by the NERDs on an educational topic, continued open forums with topics on CBME, UME curricular renewal and learning techniques.

Clinical **SERVICE**

The Department of Pathology and Laboratory Medicine is a joint venture of London Health Sciences Centre and St. Joseph's Health Care London, 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.



Grossing, Tissue Trimming, Cassetting and Sectioning

Pathology **SERVICE**

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 city-wide 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.

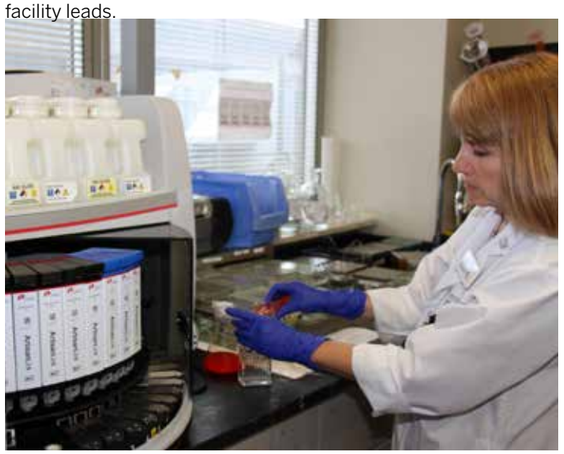
Surgical Pathology

The volume of surgical pathology specimens submitted to the Department has steadily increased in 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 one full-time equivalent, and other staff. Approval has been given for an extra pathologist position, which is expected to be filled before the end of the year. 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 (TAT) from specimen collection to report completion. This data is able 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. Staff shortages in the gross room should be alleviated by the recruitment of two new Pathologist's assistants who started in July. A third Pathologist's assistant position has been posted.

The mTuitive synoptic reporting system was implemented in March. This process has gone smoothly and has allowed us to meet the CCO standard of 90 percent complete reports, which is the first time we have been able to meet this goal. A new Dragon dictation system has been purchased, with implementation planned for September. This should prevent the numerous dictation errors occurring with our current dictation system.

We are participating in the Quality Management Partnership: (QMP), a provincial pathology quality initiative. On the 2017 survey of 10 prioritized standards, we were 100 precent compliant. The 2018 QMP survey has been completed with results expected later in 2018. A QMP regional engagement event for LIHN 2 was held in May, with attendance by all regional facility leads.



Special Stains

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.

Autopsy

The autopsy service, based at University Hospital, is a monitor of quality assurance for the London Health Sciences Centre 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 percent (from 637 to 605) compared to the previous year; however, there was there was a 6.6 percentincrease in coroners' cases (470 to 501). A 38 percent 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 London Health Sciences Centre facility was 46 percent compared to 42 percent the previous year. In 2017, an increased coroners' autopsy caseload is anticipated which will continue to challenge human resources in our Department.

Drs. Elena Tugaleva and Michael 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. Michael Shkrum continued in his role as the Director and Principal Investigator of the Motor Vehicle Safety (MOVES) Research Team. 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 – Peyton Schroder, MSc Candidate – who is studying factors contributing to trauma in pediatric rear occupants injured in motor vehicle collisions.

Autopsy Suite

Cytopathology

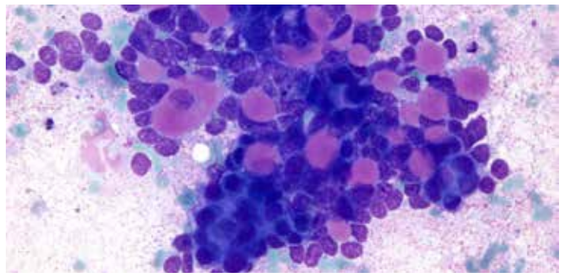
The Cytology Laboratory provides a wide range of diagnostic services to physicians in London and many regional hospitals. We deliver expert cytology consultation service to regional pathologists. The strength of our lab lies in its continued efficiency in providing test results with TAT in lab target. 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.

London Health Sciences Centre Cytopathology Group Photo

In 2016, we received 20,208 cytology cases (GYN 7,913 and Non GYN 12,295) in our division. Our cytotechnologists continue to provide an efficient and highly valued Rapid Onsite Evaluation (ROSE) FNAB service to clinicians located at all three sites (1,152 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.

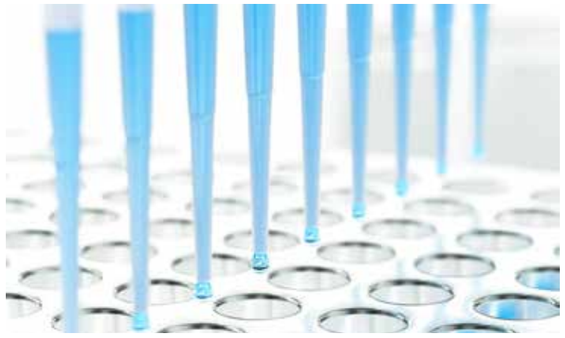
A cytopathology CME event focused on cytotechnologists and pathologists took place on October 21, 2017. This full day symposium was held at London Health Sciences Centre, University Hospital.



Adenoid Cystic Carcinoma

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.



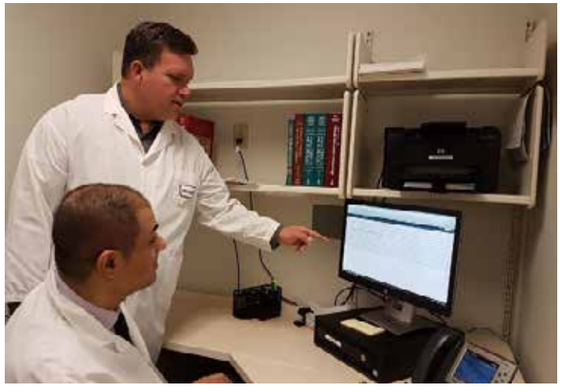
Pipetting

Testing for many inherited diseases, inherited and acquired cancers has now advanced to using technologies that interrogate panels of genes simultaneously and/or 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.

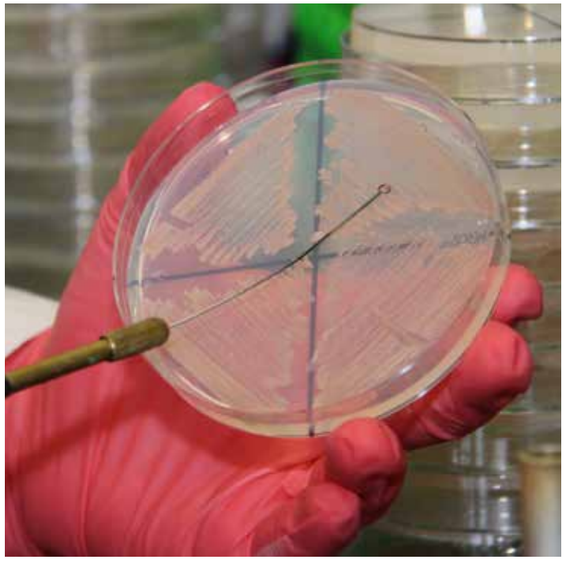
Microbiology

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.



Microbiology

Several utilization and quality improvement initiatives have been undertaken. A new algorithm for urine testing has decreased unnecessary urine cultures by 25 percent. 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



Scraping a plate

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.

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.

Laboratory **MEDICINE**

It has been an exciting and transformative year in Laboratory Medicine. With the award of over more than $7 million in capital support we take our first steps in the process of transforming our Core Laboratory, Biochemistry, Hematology and Immunology facilities into state-of-the-art high-efficiency, cost-effective, modern laboratories. Multiple teams and countless hours were devoted by laboratory staff in the bidding 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 ensure 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.

Specialty Biochemisty

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 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 the goal of improving practice.

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

Specialty Biochemistry

Toxicology, Therapeutic Drug Monitoring & Special Chemistry Laboratory

This Laboratory performs toxicology, therapeutic drug monitoring, vitamin testing, and various special chemistry tests for London Health Sciences Centre, St. Joseph's Health Care London and other hospitals across the province and nationally. In addition, as part of the Zone B 10th floor specialty biochemistry laboratory transformation, the endocrinology tests, vanillylmandelic acid, homovanillylic acid and 5-hydroxyindoleacetic acid have been developed and are now in routine use. Metanephrines methoxytyramine, serotonin and catecholamines are under development on the same instrument, allowing the repatriation of these referred out tests. Urine organic acids tested are being done in the laboratory, and the acquisition of this test represents one of the first steps in the integration of this laboratory with the Biochemical Genetic Laboratory also as part of the Zone B 10th floor specialty biochemistry laboratory transformation Collaboration with the Pharmacy Department continues in their quest to meet their own regulatory requirements, and testing in this laboratory has demonstrated that numerous Pharmacy-prepared custom drug mixtures are stable for the time period of intended clinical use. More custom drug mixtures will be tested in the immediate future. Poster presentations and a publication manuscript in preparation have resulted from these projects.

Clinical Immunology

The Immunology laboratory offers highly specialized autoantibody testing for autoimmune diseases. We have recently implemented the state-of-the-art automated instruments for IFA and Immunoblot. This new investment in technology has allowed us to increase our test menu by making it possible to perform in-house new tests. We have repatriated AMA, ASMA and ALKM testing for autoimmune liver diseases. We have also launched anti-MOG and anti-AQP4 antibody testing for Neuromyelitis Optica Spectrum Diseases. Moreover, we have expanded testing of positive ANA IFA for individual specific antinuclear antibodies by immunoblot. We are planning to perform comprehensive Autoimmune Encephalitis antibody testing for NMDA receptor, LGI1, CASPR2, AMPA1/2, GABA(B), DPPX. Currently we are in the process of method validation; this work will serve our highly sub-specialized neurology service as well as serve as a resource for regional partners in Southwestern Ontario.

We also perform protein electrophoresis for monoclonal gammopathy, cryoglobulinemia, oligoclonal banding, and beta-2 transferrin. The Immunology laboratory has also acquired an automated capillary system for serum protein electrophoresis to improve diagnostic efficiencies. We have validated and changed to the high resolution gel for urine protein electrophoresis which has increases the sensitivity for monoclonal protein bands and reduced time for concentrating urine samples and associated cost.

We stopped performing Cholinesterase phenotyping testing in-house due to very small volume of testing. The test is now sent out to a reference laboratory.

Due to the limited utilization of STAT services for ANCA testing, Stat ANCA tests are no longer being processed on Saturdays and holidays.

Trace Elements

The 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 joint replacements. In addition to routine clinical service, we also offer testing for research projects and analyze trace elements in various tissue samples.

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). This makes 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 patients with hip implants. We have successfully passed a quality audit by this manufacturer in 2017. Hair iodine testing has been discontinued because of a very small volume of testing. Plasma and urine iodine tests are now sent out to a reference laboratory.

Endocrinology and Maternal Serum Screening

After extensive consultation with clinical services, maternal serum screening has been discontinued at London Health Sciences Centre and is now being referred out to North York General Hospital.

Twenty-six automated immunoassays have been relocated from the Endocrinology Laboratory to the Core Laboratories to make better use of the analyzers in the Core Labs, to reduce the need for aliquotting of samples, and to enable the technologists from the Endocrinology Lab to perform more specialized testing. A number of low volume tests and highly manual radioimmunoassays were discontinued and those tests are now being referred out.

Assays for anti-TSH receptor antibodies and calcitonin were introduced and a new fluorescent immunoassay analyzer is being implemented.

Core Laboratories and **POINT OF CARE TESTING**

Transformation and Process Improvement

The strategic vision for laboratory medicine is to be the cornerstone of the patient journey, providing timely, quality, state of the art results to guide patient centered care. This year marked a significant leap along this path, a transformative year for laboratory medicine. With over $7 million in capital support, we sought not just to replace machinery but re-engineer our laboratory processes in the Core, Specialty Biochemistry, and Hematology Laboratories into state of the art, high-efficiency, cost-effective, modern laboratories. With replacement of our Core Laboratory instruments, transition to digital microscopy, and a move towards total laboratory automation (TLA) we have taken significant steps towards our goals to improve turnaround time (TAT), reduce costs, and improve utilization. Thirty-eight tests previously performed in the Special Biochemistry Laboratories moved to the Core Laboratory, which will improve TAT and reduce cost. With this change, we have also initiated a total rethinking of our Specialty Biochemistry Laboratories, with a focus on highly complex testing and new assay development.

Transplant Immunology transformed its processes with the adoption of real time to provide faster and more accurate HLA typing for deceased donors.

During laboratory transformation, we have validated the Roche Cobas 8000 methods for high volume immunology tests (IGAM, C3, C4, B2M, ceruloplasmin, haptoglobin, prealbumin, RF, transferrin, and CSF albumin) and moved them to the Core laboratory and implemented autoverification rules to increase work efficiency. In addition to routine clinical services, our Immunology laboratory has offered three-week lab rotation for Clinical Immunology and Allergy residents.

Quality Improvement

Quality improvement initiatives have aimed to reduce our TAT, reduce inappropriate testing, and reduce overall costs. Small changes in the process of sample handling have resulted in significant improvement in TAT and cost savings. Some selected examples of our success include:

- 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
- Shifting workload for sample loading on analyzers to specimen receiving area. Medical Laboratory Assistants have reduced the number of contact steps, resulting in an improved CBC TAT.
- Introduction of 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

A pillar of our transformational impact is to engage with clinical services to optimize test utilization, technology evaluation, and knowledge transfer. We undertook a number of quality improvement projects aimed at improving laboratory utilization. We expect to build our partnership with stakeholders to look for ways to improve current utilization and add to our test menu.

- One major ongoing initiative was the Choosing Wisely Canada goal to reduce daily bloodwork on stable patients in hospital. We have successfully reduced daily bloodwork after day three by approximately 40 percent from baseline on general medicine wards.
- 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. We have witnessed a greater than 98 percent reduction in testing and hope to publish a manuscript on our initiative in the near future.
- Menus of appropriate indications for vitamin D testing (both 25-OH and 1,25 di-OH) were developed with stakeholders including pediatrics, endocrinology, and nephrology to limit testing to specific indications. This utilization project has led a 25 percent reduction in 25-OH vitamin D testing and a 68 percent decrease in 1,25 di-OH vitamin D testing.
- Measures to ensure appropriate D Dimer testing are being instituted in the Emergency department with the use of a computer decision support tool to calculate risk scores for patients with suspected deep vein thrombosis or pulmonary embolus. The goal is to ensure the right patient gets the right test.

Hematology

New Assay Development

Core Laboratories 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 CBCs, and 210,000 coagulation tests are done in the Core Laboratories.

Dr. Mike Kadour and Claudia Sieffert

During the past year the Core Laboratories have been undergoing an extensive laboratory transformation project. As a part of this transformation project, the Core Laboratories have upgraded the analytical instrumentation for biochemistry, coagulation, and hematology testing at London Health Sciences Centre and St. Joseph's Healthcare. New laboratory automation systems have also been implemented at VH and UH to handle pre-analytical sample handling, centrifugation, aliquoting, and sample storage. This new technology has allowed the Core Laboratories to increase the number tests offered 24/7, with capacity for growth in providing new tests, built in capacity for future workload increases, and reduced time to perform add-on tests.

Digital microscopy has allowed remote viewing of blood films and enhanced educational opportunities for resident trainees and technical staff. It also provides future opportunities for the region for consultation and rapid access to expert review for critically ill patients.

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

Hemostasis and Thrombosis Laboratory

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 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.

Investigational Hematology

Investigational hematology has several specialty areas including hemoglobinopathy screening, hemostasis and thrombosis and flow cytometry. This year saw a reorganization of the specialty areas with merging of hemostasis and thrombosis and hemoglobinopathy benches with the immunology laboratory. This change provides a larger pool of highly trained technologists working on similar platforms to work together to improve efficiency of the service. It required many hours of retraining and all of the technologists rose to the challenge.

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 and hemoglobinopathy laboratories are supported by the clinical hematologists Dr. Phua (hemostasis), Drs. Lazo-Langner and Kovacs (Thrombosis) and Drs. Hsia and Solh (hemoglobinopathy). Both Drs. Solh and Phua are newly appointed clinical hematologists with specialty clinics in hemoglobinopathy and bleeding disorders and will work to ensure that the laboratories remain responsive to changing clinical needs.

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

Technologists from flow cytometry 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. This year saw the hiring of our first transfusion medicine specialist, Dr. Ziad Solh, a pediatric hematologist, who recently completed his transfusion medicine fellowship. Dr. Solh has major research interest in Knowledge Transfer, which he intends to use to improve transfusion practice and support laboratory initiatives in utilization improvement in general.

Our main focus is on appropriate utilizations where several key quality improvement initiatives have taken place including:

- Local transfusion guidelines for both pediatrics and adults approved by City Wide Blood transfusion Committee. We identified this as the first step to in anchoring our evidence based utilization of blood products.
- Ongoing and planned initiatives will include technologist screening of blood product orders with the goal of improving proportion
  - Single unit Red Blood Cell (RBC) transfusion with a target of 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 the entire hospital
  - Reducing or eliminating RBC transfusions for hemoglobin greater than 80 in the absence of bleeding
  - Reducing inappropriate frozen plasma utilization
  - Ensure Intravenous immunoglobulin (IVIG) utilization according to ministry approved guideline based on ideal body weight

Transfusion Research

With the arrival of Dr. Solh, we are developing a transfusion data warehouse for research purposes. We continue to support clinical trials including the FIBRES study comparing cryoprecipitate versus fibrinogen replacement in cardiac patients and the ABC PICU study, a multicenter trial evaluating the clinical outcome of fresh blood vs standard issued blood in critically ill pediatrics.

London Health Sciences Centre Pathology and Labratory Medicine Group Photo

Transplant Immunology

The Transplant Immunology Laboratory continues to provide 24/7 services to The Multi-Organ Transplant Program (MOTP) at London Health Sciences Centre (LHSC). In 2017, surgeons at LHSC performed a record number of kidney transplants (122) and heart transplants (19). HLA services for organ transplant are expanding not only in numbers but also in context:

- More post-transplant work such as monitoring of donor–specific antibodies (DSA), which are important to prognosis/diagnosis of rejection and guide rejection treatment and immunosuppression management.
- More work for liver transplant where HLA is considered as more important than ever before.
- Emerging roles of antibodies to non-HLA, such as anti-angiotensin II receptor 1 (AT1R) in organ transplantation. We are the 1st Canadian lab to provide such test.

In response to increasing demand for services while remaining fiscally responsible, we have made many changes to improve efficiency and quality. With the support of MOTP co-director Dr. Tony Jevnikar and Dr. Patrick Luke, we acquired $45,000 from the London Health Sciences Foundation to purchase real time PCR instrument. This will help us provide faster and more accurate HLA typing for deceased donors. We are replacing regular SSO typing kits with CWD kits, which have a similar cost, but provide better typing. We also cut 25% SSO reagent per test to accommodate increased volume. We have completed automatic workload measurement, pricing and billing in our Lab Information System.

We are currently working on automated turnaround times. This will enable us to more accurately monitor our quality improvement initiatives.

Making a Blood Smear

The Lab actively participates in many research projects, some of which have been presented by the Section Head in ASHI Annual Meeting and American Transplant Congress. Both the Senior Technologist and Section Head were invited to attend Canadian HLA working group meeting.

Since the recruitment of a new transplant hematologist, our services to hematopoietic stem cell transplant (HSCT) program are growing. The planned expansion to unrelated and one haploid-matched HSCT will dramatically increase test volume for high resolution typing. Personalized medicine in organ transplantation also demands HLA typing with higher resolution to better assess immunological risk. These increased demands will require our current method for high resolution typing (SSP) to be replaced with more cost-effective methods such as Next Generation Sequencing. This change will be necessary to keep us competitive and also to provide excellent health care to our patients.

Victoria Pathology and Labratory Medicine Group Photo

Research **OVERVIEW**

The Department of Pathology and Laboratory Medicine has maintained its excellence in both foundational and translational research at Western. Our researchers were once again successful at obtaining highly competitive peer-reviewed grants, and publishing high impact journal articles. Just over the last year, our members have received funding from the Canadian Institutes of Health Research (Art Poon, Mark Darling, and Martin Duennwald), NSERC Discovery grants (Art Poon), AstraZeneca and Pfizer (Bekim Sadikovic), the Brain Tumour Foundation of Canada Research Grant (Qi Zhang), Canadian Allergy Asthma Immunology Foundation (Lisa Cameron). In addition, our researchers received numerous other operating and fellowship grants. Our research productivity has also been excellent, as exemplified by 200 peer-reviewed publications.

> **One of our major initiatives the past few years has been to enhance inter- and intra-departmental research collaborations. We hope that we can enhance collaboration by providing opportunities for interaction through Dr. Robert Zhong Research Seminars, our Annual Pathology and Laboratory Medicine Research Day, and a revamped Paterson Lecture.**

Over the past year, we held four Dr. Robert Zhong Research Seminars, which were delivered by excellent researchers at Western. At the 2018 Research Day, we set yet another record with 84 research presentations. In addition to celebrating our research accomplishments, we were treated with a fantastic keynote address by Dr. Harold Atkins. Dr. Atkins is a physician of the Ottawa Hospital Blood and Marrow Transplant Program, an Associate Professor of Medicine at the University of Ottawa, a scientist in the Center for Innovative Cancer Research and the Medical Director of the Regenerative Medicine Program at the Ottawa Hospital Research Institute. Dr. Atkins shared his amazing work with hematopoietic stem cell transplantation to 'reprogram' the immune system of patients suffering from autoimmune diseases. The address was both inspiring and thought provoking.

Following the amazing success and high attendance of the Paterson Lecture at our 2016 Pathology and Laboratory Medicine Research Day (delivered by 2006 Nobel Laureate, Dr. Andrew Fire), the Research Committee decided to separate the research day from the Paterson Lecture to create two marquee events. We have continued to invite inspiring, high-profile researchers to deliver the Paterson Lecture. Some of these have included the 2017 Paterson Lecture, delivered by Dr. Martin Chalfie, who won the 2008 Nobel Prize in Chemistry with Roger Tsien and Osamu Shimomura "for the discovery and development of the green fluorescent protein, GFP", as well as the 2018 Paterson Lecture, delivered by Dr. Randy Schekman, who, together with Thomas Südhof and James Rothman, received the 2013 Nobel Prize "for their discoveries of machinery regulating vesicle traffic, a major transport system in our cells".

As we look ahead, our challenges essentially remain the same. Although these challenges are due to external pressures posed by diminishing research funding, the department is preparing to implement a new strategic plan of identifying research areas where we, as a department, can excel, build our capacity in the areas of priority, and capitalize on emerging opportunities.

Research **SPOTLIGHT**

Dr. Bekim Sadikovic, PhD, DABMG, FACMG, is an Associate Professor of Pathology and Laboratory Medicine at Schulich Medicine & Dentistry, Western University and Head of Molecular Genetics at the London Health Sciences Centre and St. Joseph's Health Care in London, Ontario Canada. Dr. Sadikovic is a diplomat of the American Board of Medical Genetics from Baylor College of Medicine and holds American Board of Medical Genetics certifications in Clinical Molecular Genetics and Clinical Cytogenetics. Prior to his appointment at Western, Dr. Sadikovic served as the Head of Advanced Molecular Diagnostics at McMaster University. He completed his PhD in the Department of Biochemistry at chulich Medicine & Dentistry, Western University, followed by the Canadian Cancer Society Fellowship in integrative genomics and epigenomics at Princess Margaret Hospital, SickKids Hospital, and the University of Toronto.

Dr. Sadikovic's research interests revolve around application of genomics technologies to clinical diagnostics with particular focus on development of genomic and epigenomic technologies for diagnosis of both germ-line and somatic genetic and epigenetic conditions.

His current research specifically focuses on identification of epi/genetic signatures of constitutional genetic and epigenetic syndromes, and development of analytical and bioinformatic approaches and genomic databases for clinical diagnostic applications.

Dr. Sadikovic has authored more than 60 manuscripts in peer reviewed journals, and as the Head of the PaLM translational genomic research laboratory, he has overseen translation of this research to a number of clinical applications including novel diagnostic technologies, resulting in a number of exclusive government laboratory testing licenses and contracts as well as public-private partnerships. Notably, under his oversight, Pathology and Laboratory Medicine Molecular Genetics Laboratory has become the provincial reference laboratory and a national center of excellence for a broad range of hereditary genetic conditions including hereditary cancers, mitochondrial and metabolic disorders and epilepsy to name a few.

More recently, it has become the first Canadian laboratory to, through licensing agreement with the global life sciences company LabCorp® and its Canadian partner Dynacare, provide genetic testing for Charcot–Marie–Tooth disease, epilepsy and mitochondrial disorders for patients world-wide.

In his clinical role, Dr. Sadikovic oversees the Pathology and Laboratory Medicine Molecular Genetics Laboratory performing constitutional, prenatal, and somatic genomic testing across a wide range of genomic disorders for patients across Canada and internationally. He is an active member on a number of National and International committees, advisory and working groups including Ministry of Health, Cancer Care Ontario, American and Canadian College of Medical Genetics related to development, regulation and implementation of clinical genetic testing and services.

Dr. Bekim Sadikovic

Department **PUBLICATIONS**

1. Abbott JA, Guth E, Kim C, Regan C, Siu VM, C. **Rupar CA**, Demeler B, Francklyn CS, Robey-Bond SM. *The Usher Syndrome Type IIIB Histidyl-tRNA Synthetase Mutation Confers Temperature Sensitivity. Biochemistry.* 2017 Jul 18;56(28):3619-3631. DOI: 10.1021/acs.biochem.7b00114. Epub 2017 Jul 7. PMID: 28632987.

2. Abdelhameed M, Martir DR, Chen S, Xu WZ, Oyeneye OO, **Chakrabarti S**, Zysman-Colman E, Charpentier PA. *Tuning the Optical Properties of Silicon Quantum Dots via Surface Functionalization with Conjugated Aromatic Fluorophores.* Sci Rep. 2018 Feb 14;8(1):3050. DOI: 10.1038/s41598-018-21181-8. PMID: 29445234

3. Adams P, **Howlett C**, Xenocostas A, **Chakrabarti S**. *Sex-specific analysis post-liver transplantation in hemochromatosis with aplastic anemia and hepatocellular carcinoma.* Hepatol Commun. 2017 Nov 11;2(1):13-15. DOI: 10.1002/hep4.1122. eCollection 2018 Jan. PMID: 29404507.

4. Adeyanju K, **Bend JR**, Rieder MJ, Dekaban GA. *HIV-1 Tat expression and sulphamethoxazole hydroxylamine mediated oxidative stress alter the disulfide proteome in Jurkat T cells.* Virology Journal, In Press (VIRJ-D-18-00011R2).

5. Amtul Z, Hill DJ, **Arany EJ**, Cechetto DF. *Altered Insulin/Insulin-Like Growth Factor Signaling in a Comorbid Rat model of Ischemia and β-Amyloid Toxicity*.Sci Rep. 2018 Mar 23;8(1):5136. DOI: 10.1038/s41598-018-22985-4. PMID: 29572520.

6. Aref-Eshghi E, Rodenhiser DI, Schenkel LC, **Lin H,** Skinner C, **Ainsworth P**, Pare G, Hood RL, Bulman DE, Kernohan KD, Care4Rare Canada Consortium, Boycott KM, Campeau PM, Schwartz C, **Sadikovic B**. *Genomic DNA Methylation Signatures Enable Concurrent Diagnosis and Clinical Genetic Variant Classification in Neurodevelopmental Syndromes.* Am J Hum Genet. 2018 Jan 4;102(1):156-174. DOI: 10.1016/j.ajhg.2017.12.008. PMID: 29304373.

7. Aref-Eshghi E, Schenkel LC, **Ainsworth P**, **Lin H**, Rodenhiser DI, Cutz JC, Sadikovic B. *Genomic DNA Methylation-Derived Algorithm Enables Accurate Detection of Malignant Prostate Tissues.* Front Oncol. 2018 Apr 23;8:100. DOI: 10.3389/fonc.2018.00100. eCollection 2018. PMID: 29740534.

8. Aref-Eshghi E, Schenkel LC, **Lin H**, Skinner C, **Ainsworth P**, Paré G, Rodenhiser D, Schwartz C, **Sadikovic B**. *The defining DNA methylation signature of Kabuki syndrome enables functional assessment of genetic variants of unknown clinical significance.* Epigenetics. 2017 Sep 21:0. DOI: 10.1080/15592294.2017.1381807. [Epub ahead of print]. PMID 28933623.

9. Aref-Eshghi E, Schenkel LC, **Lin H,** Skinner C, **Ainsworth P**, Paré G, Siu V, Rodenhiser D, Schwartz C, **Sadikovic B**. *Clinical Validation of a Genome-Wide DNA Methylation Assay for Molecular Diagnosis of Imprinting Disorders.* J Mol Diagn. 2017 Aug 11, Senior Responsible Author, DOI: 10.1016/j.jmoldx.2017.07.002. PMID 28807811.

10. Aref-Eshghi E, Schenkel LC, Lin H, Skinner C, **Ainsworth P**, Paré G, Rodenhiser D, Schwartz C, **Sadikovic B**. *The defining DNA methylation signature of Kabuki syndrome enables functional assessment of genetic variants of unknown clinical significance.* Epigenetics. 2017;12(11):923-933. DOI: 10.1080/15592294.2017.1381807. Epub 2017 Nov 7. PMID: 28933623

11. Balci TB, Hartley T, Xi Y, Dyment DA, Beaulieu CL, Bernier FP, Dupuis L, Horvath GA, Mendoza-Londono R, Prasad C, Richer J, Yang XR, Armour CM, Bareke E, Fernandez BA, McMillan HJ, Lamont RE, Majewski J, Parboosingh JS, Prasad AN, **Rupar CA**, Schwartzentruber J, Smith AC, Tétreault M; FORGE Canada Consortium; Care4Rare Canada Consortium, Innes AM, Boycott KM. *Debunking Occam's razor: Diagnosing multiple genetic diseases in families by whole exome sequencing*. Clin Genet. 2017 Sep;92(3):281-289. DOI: 10.1111/cge.12987. Epub 2017 Mar 13. PMID: 28170084.

12. Banaschewski BJH, Baer B, Arsenault C, Jazey T, Veldhuizen EJA, **Delport J**, Gooyers T, Lewis JF, Haagsman HP, Veldhuizen RAW, Yamashita C. *The Antibacterial and Anti-inflammatory Activity of Chicken Cathelicidin-2 combined with Exogenous Surfactant for the Treatment of Cystic Fibrosis-Associated Pathogens.* Sci Rep. 2017 Nov 14;7(1):15545. DOI: 10.1038/s41598-017-15558-4. PMID: 29138462.

13. Barber C, **Hammond R**, Gula L, Tithecott G, Chahine S. *In Search of Black Swans: Identifying Students at Risk of Failing Licensing Examinations.* Acad Med. 2018 Mar;93(3):478-485. DOI: 10.1097/ACM.0000000000001938 PMID: 28953566

14. Barton M, McKelvie B, **Campigotto A**, Mullowney T. *Legionellosis following water birth in a hot tub in a Canadian neonate.* CMAJ. 2017 Oct 23;189(42):E1311-E1313. DOI: 10.1503/cmaj.170711. PMID: 29061856

15. Biswas S, Feng B, Thomas A, Chen S, Aref-Eshghi E, **Sadikovic B**, **Chakrabarti S**. *Endothelin-1 regulation is entangled in a complex web of epigenetic mechanisms in diabetes.* Physiol Res. 2018 Jun 27;67(Supplementum 1):S115-S125. PMID: 29947532

16. Biswas S, Thomas A , Biao F, Chen S , Gonder J, **Chakrabarti S**. *Role of Long Non-Coding RNA MALAT1 in the Pathogenesis of Diabetic Retinopathy.* Canad. J. Diab 41(suppl) 159A, 2017.

17. Biswas S, Thomas A, Feng B, Chen S, E Aref-Eshghi , Gonder J, Sadikovic B, **Chakrabarti S**. *MALAT1 and HOTAIR: Key Epigenetic Regulators in Diabetic Retinopathy.* Diabetes 66 (suppl. 1). https://plan.core-apps.com/tristar_ada18/abstract/807d2f9885450670bb994661e367b251

18. Biswas S, Thomas AA, **Chakrabarti S**. *LncRNAs: Proverbial Genomic "Junk" or Key Epigenetic Regulators During Cardiac Fibrosis in Diabetes?*. Front Cardiovasc Med. 2018 Apr 4;5:28. DOI: 10.3389/fcvm.2018.00028. eCollection 2018. PMID: 29670886.

19. Biswas S, Thomas AA, Chen S, Aref-Eshghi, Feng B, Gonder J, **Sadikovic B**, **Chakrabarti S**. *MALAT1: An Epigenetic Regulator of Inflammation in Diabetic Retinopathy.* Sci Rep. April 2018;8(1):6526. DOI:10.1038/s41598-018-24907-w. PMID: 29695738.

20. Brackstone M, Palma D, **Tuck AB**, Scott L, Potvin K, Vandenberg T, Perera F, D'Souza D, Taves D, Kornecki A5, Muscedere G, Chambers AF. *Concurrent Neoadjuvant Chemotherapy and Radiation Therapy in Locally Advanced Breast Cancer.* Int J Radiat Oncol Biol Phys. 2017 Nov 15;99(4):769-776. doi: 10.1016/j.ijrobp.2017.06.005. Epub 2017 Jun 20. PMID: 28870785

21. Brady L, **Sadikovic B**, **Rupar CA**, Tarnopolsky MA. *Complete elimination of a pathogenic homoplasmic mtDNA mutation in one generation. Mitochondrion.* 2018 Feb 1. pii: S1567-7249(17)30328-8. DOI: 10.1016/j.mito.2018.01.010. [Epub ahead of print]. PMID: 29408632.

22. Brewer-Deluce D, **Gibson CJ**. *Teaching Matters: Developing Teaching Dossiers to Showcase Teaching Success and Competency.* Teaching Innovation Projects: Vol. 7: Iss. 1 Article 1, 2017. Available at: http://ir.lib.uwo.ca/tips/vol7/iss1/1

23. Brichacek M, Naeem A, Filler G, **Hammond R**, Yazdani A, Ranger A. *Congenital Calvarial Hemangioma.* J Craniofac Surg. 2018 May 8. DOI: 10.1097/SCS.0000000000004613. [Epub ahead of print] PMID: 29742579

24. Brooks SD, Hileman SM, Chantler PD, Milde SA, Lemaster KA, **Frisbee SJ**, Shoemaker JK, Jackson DN, Frisbee JC. *Protection from chronic stress- and depressive symptom-induced vascular endothelial dysfunction in female rats is abolished by preexisting metabolic disease.* Am J Physiol Heart Circ Physiol. 2018 May 1;314(5):H1085-H1097. DOI: 10.1152/ajpheart.00648.2017. Epub 2018 Feb 16. PMID: 29451819

25. Brooks SD, Hileman SM, Chantler PD, Milde SA, Lemaster KA, **Frisbee SJ**, Shoemaker JK, Jackson DN, Frisbee JC. *Protection from vascular dysfunction in female rats with chronic stress and depressive symptoms.* Am J Physiol Heart Circ Physiol. 2018 May 1;314(5):H1070-H1084. DOI: 10.1152/ajpheart.00647.2017. Epub 2018 Feb 16. PMID:29451821.

26. **Cecchini MJ**, **Walsh JC**, **Parfitt J**, **Chakrabarti S**, Correa R, MacKenzie MJ, **Driman DK**. *The Utility of CDX2 loss as a prognostic marker in state II colon cancer.* 2017/07/01.

27. **Darling MR**, Su N, Masen S, Kwon P, Fortino D, McKerlie T, Grushka M. *Geographic tongue: assessment of peripheral nerve status, Langerhans cell, and HLA-DR expression.* Oral Surg Oral Med Oral Pathol Oral Radiol. 2017 Oct; 124(4):371-377. PMID: 28757081.

28. Das S, **Ang LC**, **Ramsay D**. *Intrasellar cavernous hemangioma presenting as pituitary adenoma: A report of two cases and review of the literature.* Clin Neuropathol. 2017 Nov 30. doi: 10.5414/NP301012. [Epub ahead of print]. PMID: 29189199.

29. Datar R, Prasad AN, Tay KY, **Rupar CA**, Ohorodnyk P, Miller M, Prasad C. *Magnetic resonance imaging in the diagnosis of white matter signal abnormalities.* Neuroradiol J. 2018 Jan 1:1971400918764016. DOI: 10.1177/1971400918764016. [Epub ahead of print]. PMID: 29517408

30. Dhanuthai K, Rojanawatsirivej S, Thosaporn W, Kintarak S, Subarnbhesaj A, **Darling M**, Kryshtalskyj E, Chiang CP, Shin HI, Choi SY, Lee SS, Aminishakib P. *Oral cancer: A multicenter study.* Med Oral Patol Oral Cir Bucal. 2018 Jan 1;23(1):e23-e29. DOI: 10.4317/medoral.21999. PMID: 29274153.

31. Di Meo A, Saleeb R, Wala SJ, Khella HW, Ding Q, Zhai H, Krishan K, Krizova A, **Gabril M**, Evans A, Brimo F, Pasic MD, Finelli A, Diamandis EP, Yousef GM. *A miRNA-based classification of renal cell carcinoma subtypes by PCR and in situ hybridization.* Oncotarget. 2017 Dec 8;9(2):2092-2104. DOI: 10.18632/oncotarget.23162. eCollection 2018 Jan 5. PMID: 29416756

32. Dickson BC, Antonescu CR, Argyris PP, Bilodeau EA, Bullock MJ, Freedman PD, Gnepp DR, Jordan RC, Koutlas IG, Lee CH, Leong I, Merzianu M, Purgina BM, Thompson LDR, **Wehrli B**, Wright JM, Swanson D, Zhang L, Bishop JA. *Ectomesenchymal Chondromyxoid Tumor: A Neoplasm Characterized by Recurrent RREB1-MKL2 Fusions.* Am J Surg Pathol. 2018 Jun 15. DOI: 10.1097/PAS.0000000000001096. [Epub ahead of print] PMID: 29912715

33. **Driman D**, **Schick B**. *Image editing for pathologists.* Histopathology 2017, 70, 840–841. DOI: 10.1111/his.13146. PMID: 28297121.

34. Evetts AM, **Shkrum MJ**, **Tugaleva E**. *A New Reference Source for Postmortem Body Measurements and Organ Weights in Neonates and Infants: A Statistical Analysis Based on Sudden Death Classification (Part 2).* Am J Forensic Med Pathol. 2018 May 24. DOI: 10.1097/PAF.0000000000000401. [Epub ahead of print] PMID: 29794804

35. Farhan SMK, Nixon KCJ, Everest M, Edwards TN, Long S, Segal D, Knip MJ, Arts HH, Chakrabarti R, Wang J, Robinson JF, Lee D, Mirsattari SM, **Rupar CA**, Siu VM; FORGE Canada Consortium, Poulter MO, Hegele RA, Kramer JM. *Identification of a novel synaptic protein, TMTC3, involved in periventricular nodular heterotopia with intellectual disability and epilepsy.* Hum Mol Genet. 2017 Nov 1;26(21):4278-4289. doi: 10.1093/hmg/ddx316. PMID: 28973161.

36. Fazio EN, Young CC, Toma J, Levy M, Berger KR, Johnson CL, Mehmood R, Swan P, Chu A, Cregan SP, Dilworth FJ, **Howlett CJ**, Pin CL. *Activating Transcription Factor 3 promotes loss of the acinar cell phenotype in response to cerulein-induced pancreatitis in mice.* Mol Biol Cell, 2017 Jul 12, Coauthor, DOI: 10.1091/mbc.E17-04-0254. PMID 28701342.

37. Feng B, Chen S, **Chakrabarti S**. *Long non-coding RNA ZFAS1 in Diabetic Cardiomyopathy.* Diabetes 66 (suppl. 1). https://plan.core-apps.com/tristar_ada18/abstract/807d2f9885450670bb994661e36eae9b

38. **Filler G**, Kobrzynski M, Sidhu HK, Belostotsky V, Huang SHS, McIntyre C, **Yang L**. *A cross-sectional study measuring vanadium and chromium levels in paediatric patients with CKD.* BMJ Open 2017;0:e014821. DOI:10.1136/bmjopen-2016-014821. PMID 28592575.

39. **Filler G**, Alvarez-Elías AC, McIntyre C, Medeiros M. *The compelling case for therapeutic drug monitoring of mycophenolate mofetil therapy.* Pediatr Nephrol 2017/01/01: 32 (1) p21-29. DOI: 10.1007/s00467-016-3352-2 / PMID 26921212.

40. **Filler G**, Belostotsky V, Kobrzynski M, Huang SS, **Yang L**. *High prevalence of elevated molybdenum levels in pediatric CKD patients. A cross-sectional and longitudinal study.* Clin Nephrol 2017/08/01: 88 (8) p79-85. DOI: 10.5414/CN109015 / PMID 28502322.

41. **Filler G**, Ferris M. *We have to do more for former paediatric renal transplant recipients!* Transpl Int 2017/09/02: doi: 10.1111/tri.13058 / PMID 28865119.

42. **Filler G**, Huang SS. *Spot urine protein to creatinine ratio.* Pediatr Nephrol 2017/02/14: DOI: 10.1007/s00467-017-3605-8/PMID 28197886.

43. **Filler G**, Kobrzynski M, Sidhu HK, Belostotsky V, Huang SHS, McIntyre C, **Yang L**. *A cross-sectional study measuring vanadium and chromium levels in paediatric patients with CKD.* BMJ Open 2017; 7(5) :e014821. DOI:10.1136/bmjopen-2016-014821. PMID 28592575.

44. **Filler G**, Lee M, Hegele RA. *Barriers to the Implementation of Lipoprotein Apheresis in Canada.* Can J Cardiol 2017/03/01: 33 (3) p409-411. DOI: 10.1016/j.cjca.2017.01.008 / PMID 28232020.

45. **Filler G**, Licht C, Huang SS. *Is there a case for eculizumab for pediatric renal transplantation?* Pediatr Transplant. 2018 Feb 7. doi: 10.1111/petr.13128. [Epub ahead of print]. PMID: 29417722.

46. **Filler G**, Medeiros M. I*mproving long-term outcomes after pediatric renal transplantation by addressing dyslipidemia.* Pediatr Transplant 2017/05/01: 21 (3) doi: 10.1111/petr.12880 / PMID 28370889.

47. **Filler G**, Taheri S, McIntyre C, Smith C, Subramanian L, Fusch G, Fusch C. *Chronic kidney disease stage affects small, dense low-density lipoprotein but not glycated low-density lipoprotein in younger chronic kidney disease patients: a cross-sectional study.* Clin Kidney J. 2018 Jun;11(3):383-388. DOI: 10.1093/ckj/sfx115. Epub 2017 Oct 12. PMID: 29992019

48. Florez ID, Brouwers M, **Solh Z**. *Knowledge translation in transfusion medicine. Part 2: Selecting the knowledge and identifying the barriers.* Transfusion. 2018 May;58(5):1097-1099. DOI: 10.1111/trf.14505. Epub 2018 Feb 15. PMID: 29446448.

49. **Frisbee SJ**, Singh SS, Jackson DN, Lemaster KA, Milde SA, Shoemaker JK, Frisbee JC. *Beneficial Pleiotropic Antidepressive Effects of Cardiovascular Disease Risk Factor Interventions in the Metabolic Syndrome.* J Am Heart Assoc. 2018 Mar 26;7(7). pii: e008185. DOI: 10.1161/JAHA.117.008185. PMID: 29581223.

50. Gibson RM, Nickel G, Crawford M, Kyeyune F, Venner C, Nankya I, Nabulime E, Ndashimye E, **Poon AFY**, Salata RA, Kityo C, Mugyenyi P, Quiñones-Mateu ME, Arts EJ. *Sensitive detection of HIV-1 resistance to Zidovudine and impact on treatment outcomes in low- to middle-income countries.* Infect Dis Poverty. 2017 Dec 4;6(1):163. doi: 10.1186/s40249-017-0377-0. PMID:29202874.

51. Goebel EA, **Ettler HC**, **Walsh JC**. *Intradepartmental consultations in surgical pathology: Review of a standardized process and factors influencing consultation rates and practices in an academic and community hospital setting.* Pathology - Research and Practice, Volume 214, Issue 4,2018, Pages 542-546, ISSN 0344-0338, https://doi.org/10.1016/j.prp.2018.02.009.

52. Goebel EA, **McLachlin CM**, **Ettler HC**, **Weir MM**. *Insufficient and Scant Endometrial Samples: Determining Clinicopathologic Outcomes and Consistency in Reporting.* Int J Gynecol Pathol. 2018 May 10. DOI: 10.1097/PGP.0000000000000514. [Epub ahead of print] PMID: 29750710

53. Goebel EA, Stegmaier M, Gorassini DR, Kubica M, **Parfitt JR, Driman DK**. *Grading of Total Mesorectal Excision Specimens: Assessment of Interrater Agreement.* Dis Colon Rectum. 2018 Jun;61(6):686-691. DOI: 10.1097/DCR.0000000000000994. PMID: 29722727.

54. Gordon AD, Biswas S, Feng B, **Chakrabarti S**. *MALAT1: A regulator of inflammatory cytokines in diabetic complications.* Endocrinol Diabetes Metab. Jan 2018; e00010. DOI:10.1002/edm2.10.

55. **Haig A**. *A novel approach to off-clamp partial nephrectomy demonstrates significant improvement in renal injury in an experimental porcine model.* Canadian Urological Association Journal 2017/10/01.

56. Harricharan S, Biederman K, Bombassaro AM, Lazo-Langner A, Elsayed S, Fulford A, **Delport JA**, and Xenocostas A. *Adherence and Outcomes of a Galactomannan Screening Protocol in High Risk Hematology Patients.* Curr Oncol. 2018 Apr;25(2):e139-e145. DOI: 10.3747/co.25.3848. Epub 2018 Apr 30. PMID: 29719438.

57. Huang J, Khan A, Au BC, Barber DL, López-Vásquez L, Prokopishyn NL, Boutin M, Rothe M, Rip JW, Abaoui M, Nagree MS, Dworski S, Schambach A, Keating A, West ML, Klassen J, Turner PV, Sirrs S, **Rupar CA**, Auray-Blais C, Foley R, Medin JA. *Lentivector Iterations and Pre-Clinical Scale-up/Toxicity Testing: Targeting Patient Mobilized CD34+ Hematopoietic Cells for Correction of Fabry Disease.* Mol Ther Methods Clin Dev. 2017 May 12;5:241-258. doi: 10.1016/j.omtm.2017.05.003. eCollection 2017 Jun 16. PMID: 28603745.

58. Huynh M, Clark R, Li J, **Filler G**, Dave S. *A case control analysis investigating risk factors and outcomes for nephrocalcinosis and renal calculi in neonates.* J Pediatr Urol 2017/07/27: doi: 10.1016/j.jpurol.2017.06.018 / PMID 28821388.

59. Ikeda KM, Aldosari MM, Mirsattari SM, AlGhefari H, **Hammond RR**. *Focal Cortical Dysplasia Type IIa Manifesting as Epilepsia Partialis Continua for 50 Years.* Can J Neurol Sci. 2018 Jan;45(1):106-108. DOI: 10.1017/cjn.2017.237. Epub 2017 Oct 2. PMID: 28965498

60. Ioanidis KE, MacNeil SD, Tay KY, **Wehrli B**. *An atypical lipomatous tumor mimicking a giant fibrovascular polyp of the hypopharynx: A case report.* Medicine (Baltimore). 2017 Oct;96(43):e6927. DOI: 10.1097/MD.0000000000006927. PMID: 29068974.

61. Ishak CA, Cecchini MJ, **Howlett CJ**, Dick FA. *Immunohistochemical Detection of the Retinoblastoma Protein.* Methods Mol Biol, 2018 Jan 1; 1726: 65-75. DOI: 10.1007/978-1-4939-7565-5_7. PMID: 29468544.

62. Ismail OZ, **Bhayana V**. *Lipase or amylase for the diagnosis of acute pancreatitis?* Clin Biochem. 2017 Jul 16. pii: S0009-9120(17)30356-9. DOI: 10.1016/j.clinbiochem.2017.07.003. [Epub ahead of print]. PMID 2872034.

63. Kalia V, Daher O, Garvin G, Chhibber S, **Shepherd J**. *Synchronous bilateral lipoma arborescens of bicipitoradial bursa-a rare entity.* Skeletal Radiol. 2018 Mar 2. DOI: 10.1007/s00256-018-2915-7. [Epub ahead of print] PMID: 29500484

64. Karapetyan V, Staudt MD, McGregor SM, BAlYamany, Haji FA, **Ang LC**, Siddiqi F. *P.143 Spinal cord intramedullary malignant peripheral nerve sheath tumour: case report and review of literature.* Canadian Journal of Neurological Sciences. Volume 45, June 2018, p. S54

65. Kerkhof J, Schenkel LC, Reilly J, McRobbie S, Aref-Eshghi E, Stuart A, Rupar CA, Adams P, Hegele RA, **Lin H**, Rodenhiser D, **Knoll J**, **Ainsworth PJ**, **Sadikovic B**. *Clinical Validation of Copy Number Variant Detection from Targeted Next-Generation Sequencing Panels.* J Mol Diagn, 2017 Aug 14, Senior Responsible Author, DOI: 10.1016/j.jmoldx.2017.07.004. PMID 28818680.

66. Kolendowski B, Hassan H, Krstic M, Isovic M, Thillainadesan G, **Chambers AF**, **Tuck AB**, Torchia J. *Genome-wide analysis reveals a role for TDG in estrogen receptor-mediated enhancer RNA transcription and 3-dimensional reorganization.* Epigenetics Chromatin. 2018 Jan 29;11(1):5. DOI: 10.1186/s13072-018-0176-2. PMID: 29378668.

67. Kotsopoulos J, Gronwald J, Karlan B, Rosen B, Huzarski T, Moller P, Lynch HT, Singer CF, Senter L, Neuhausen SL, Tung N, Eisen A, Foulkes WD, **Ainsworth P**, Sun P, Lubinski J, Narod SA; *Hereditary Ovarian Cancer Clinical Study Group. Age-specific ovarian cancer risks among women with a BRCA1 or BRCA2 mutation.* Gynecol Oncol. 2018 May 21. pii: S0090-8258(18)30898-9. DOI: 10.1016/j.ygyno.2018.05.011. [Epub ahead of print]. PMID: 2979380.

68. Kotsopoulos J, Gronwald J, Lynch HT, Eisen A, Neuhausen SL, Tung N, **Ainsworth P**, Weitzel JN, Pal T, Foulkes WD, Eng C, Singer CF, Senter L, Sun P, Lubinski J, Narod SA; *Hereditary Breast Cancer Clinical Study Group. Age at first full-term birth and breast cancer risk in BRCA1 and BRCA2 mutation carriers.* Breast Cancer Res Treat. 2018 May 17. DOI: 10.1007/s10549-018-4822-y. [Epub ahead of print]. PMID: 29774471.

69. Kwan BYM, Salehi F, Kope R, Lee DH, Sharma M, **Hammond R**, Burneo JG, Steven D, Peters T, Khan AR. *Evaluation of ex-vivo 9.4T MRI in post-surgical specimens from temporal lobe epilepsy patients.* J Neuroradiol. 2017 Jul 4. pii: S0150-9861(17)30161-X. DOI: 10.1016/j.neurad.2017.05.007. [Epub ahead of print]. PMID: 28687122.

70. Langdon K, Singsnaeh A, Young G, **Hammond R**. *Adult-onset progressive dementia and myoclonic epilepsy with polyglucosan bodies.* (2017). Canadian Journal of Neurological Sciences / Journal Canadien Des Sciences Neurologiques,44(S1), S4-S4. DOI:10.1017/cjn.2017.11.

71. Langdon KD, Krivosheya D, Hebb MO, Wehrli B and **Ang LC**. *Extracranial invasion of a recurrent, transformed anaplastic pleomorphic xanthoastrocytoma: a case report.* Volume 45, Supplement S1 (ABSTRACTS: 57th Annual Canadian Association of Neuropathologists Meeting) May 2018, pp.S2-S3

72. Lant JT, Berg MD, Sze DHW, Hoffman KS, Akinpelu IC, Turk MA, Heinemann IU, **Duennwald ML**, Brandl CJ, O'Donoghue P. *Visualizing tRNA-dependent mistranslation in human cells.* RNA Biol. 2017 Sep 21:1-9. DOI: 10.1080/15476286.2017.1379645. [Epub ahead of print]. PMID: 28933646.

73. Lebo MS, Zakoor K-R, Chun K, Speevak MD, Waye JS, McCready E, Parboosingh JS, Lamont RE, Feilotter H, Bosdet I, Tucker T, Young S, Karsan A, Charames GS, Agatep R, Spriggs EL, Chisholm C, Vasli N, Daoud H, Jarinova O, Tomaszewski R, Hume S, Taylor S, Akbari MR, Lerner-Ellis J, **Ainsworth P**, et. al. Canadian Open Genetics Repository Working Group17. *Data sharing as a national quality improvement program: Reporting on BRCA1 and BRCA2 variant-interpretation comparisons through the Canadian Open Genetics Repository (COGR).* Genet Med. 2018 Mar;20(3):294-302. DOI: 10.1038/gim.2017.80. Epub 2017 Jul 20. PMID: 28726806

74. Lebo MS, Zakoor KR, Chun K, Speevak MD, Waye JS, McCready E, Parboosingh JS, Lamont RE, Feilotter H, Bosdet I, Tucker T, Young S, Karsan A, Charames GS, Agatep R, Spriggs EL, Chisholm C, Vasli N, Daoud H, Jarinova O, Tomaszewski R, Hume S, Taylor S, Akbari MR, Lerner-Ellis J, *Canadian Open Genetics Repository Working Group. Data sharing as a national quality improvement program: reporting on BRCA1 and BRCA2 variant-interpretation comparisons through the Canadian Open Genetics Repository (COGR).* Genet Med, 2017 Jul 20, **Sadikovic B**, COGR Working Group Member, DOI: 10.1038/gim.2017.80. PMID 28726806.

75. Lebo MS, Zakoor K-R, Chun K, Speevak MD, Waye JS, McCready E, Parboosingh JS, Lamont RE, Feilotter H, Bosdet I, Tucker T, Young S, Karsan A, Charames GS, Agatep R, Spriggs EL, Chisholm C, Vasli N, Daoud H, Jarinova O, Tomaszewski R, Hume S, Taylor S, Akbari MR, Lerner-Ellis J, **Ainsworth P**, Aronson M, Basran R, Blavier A, Blumenthal A, Boycott K, Brudno M, Buckley K, Campbell J, Campeau PM, Care M, Carson N, Carter R, Chitayat D, Chong G, Chouinard E, Craddock KJ, Docking R, Eisen A, Faghfoury H, Farrell S, Fernandez B, Fiume M, Forster-Gibson C, Friedman J, Foulkes W, Goodhand P, Gu J, Hegele R, Holter S, Horsburgh S, Hughes L, Jewett F, Junker A, Khalouei S, **Knoll J**, Kolomeitz E, Knoppers B, Maire G, Marshall C, Mitchell G, Moorhouse MJ, Morel C, Nelson T, Noor A, O'Connor B, O'Rielly D, Ouellette F, Racher H, Ray P, Rehm H, Riddell C, Riviere, J-B, Rosenblatt DS, Rouleau G, Ruchon A, Sabatini P, **Sadikovic B**, Semotiuk K, Scherer SW, Shuman C, Silver J, Siminovitch K, Solomon-Izsak L, Soucy J-F, Stavropoulos J, Stein L, Tannenbaum R, Terespolsky D, Wintle RF, Wong B, Wong N, Wang M, Watkins N, White S, Woods MO, Wyatt P, *Canadian Open Genetics Repository Working Group17. Data sharing as a national quality improvement program: Reporting on BRCA1 and BRCA2 variant-interpretation comparisons through the Canadian Open Genetics Repository (COGR).* (2018) Genetics in Medicine, 20 (3), pp. 294-302. DOI: 10.1038/gim.2017.80.

76. Lee JY, Ismail OZ, Zhang X, **Haig A**, Lian D, Gunaratnam L. *Donor kidney injury molecule-1 promotes graft recovery by regulating systemic necroinflammation.* Am J Transplant. 2018 Mar 30. DOI: 10.1111/ajt.14745. [Epub ahead of print]. PMID: 29603641.

77. Lee M, Barr J, Kribs S, **Filler G**. *Strategies to reduce line infections in a small child with homozygous familial hypercholesterolaemia who cannot yet receive LDL apheresis.* BMJ Case Rep 2017/09/01: 2017 DOI: 10.1136/bcr-2017-219538 / PMID 28866629.

78. Lin S, Lian D, Liu W, **Haig A**, Lobb I, Hijazi A, Razvi H, Burton J, Whiteman M, Sener A. *Daily therapy with a slow-releasing H2S donor GYY4137 enables early functional recovery and ameliorates renal injury associated with urinary obstruction.* Nitric Oxide. 2018 Mar 6;76:16-28. DOI: 10.1016/j.niox.2018.03.002. [Epub ahead of print]. PMID: 29522906.

79. Liu J, Li Y, Wilkins R, Flegal F, **Knoll JHM**, Rogan PK. *Accurate Cytogenetic Biodosimetry Through Automated Dicentric Chromosome Curation And Metaphase Cell Selection.*F1000Res. 2017 Aug 9;6:1396. DOI: 10.12688/f1000research.12226.1. eCollection 2017. PMID: 29026522.

80. Liu Y, Sethi NS, Hinoue T, Schneider BG, Cherniack AD, Sanchez-Vega F, Seoane JA, Farshidfar F, Bowlby R, Islam M, Kim J, Chatila W, Akbani R, Kanchi RS, Rabkin CS, Willis JE, Wang KK, McCall SJ, Mishra L, Ojesina AI, Bullman S, Pedamallu CS, Lazar AJ, Sakai R, Cancer Genome Atlas Research Network., Thorsson V, Bass AJ, Laird PW. *Comparative Molecular Analysis of Gastrointestinal Adenocarcinomas* (**Parfitt, J**). Cancer Cell. 2018 Apr 9;33(4):721-735.e8. DOI: 10.1016/j.ccell.2018.03.010. Epub 2018 Apr 2. PMID: 29622466

81. Mataseje LF, Boyd DA, **Fuller J**, Haldane D, Hoang L, Lefebvre B, Melano RG, Poutanen S, Van Caeseele P, Mulvey MR. *Characterization of OXA-48-like carbapenemase producers in Canada, 2011-14.* J Antimicrob Chemother. 2017 Dec 18. doi: 10.1093/jac/dkx462. [Epub ahead of print]. PMID: 29272439.

82. McCloskey RM, **Poon AFY**. *A model-based clustering method to detect infectious disease transmission outbreaks from sequence variation.* PLoS Comput Biol. 2017 Nov 13;13(11):e1005868. DOI: 10.1371/journal.pcbi.1005868. eCollection 2017 Nov. PMID: 29131825.

83. McGee J, Panabaker K, Leonard S, **Ainsworth P**, Elit L, Shariff SZ. *Genetics Consultation Rates Following a Diagnosis of High-Grade Serous Ovarian Carcinoma in the Canadian Province of Ontario.* Int J Gynecol Cancer, 2017 Jan 9. DOI: 10.1097/IGC.0000000000000907. PMID: 28072594.

84. Medeiros M, Lumini J, Stern N, Castañeda-Hernández G, **Filler G**. *Generic immunosuppressants.* Pediatr Nephrol 2017/07/21: DOI: 10.1007/s00467-017-3735-z / PMID 28733752.

85. Olvera-Posada D, Lin S, Aboalsamh G, **Haig A**, Lobb I, Grewal J, Saha MN, Sener A. *A novel approach to off-clamp partial nephrectomy demonstrates significant improvements in renal injury in an experimental porcine mode.* Journal of the Canadian Urological Association. Volume 11, Issue 10, October 2017, Pages E390-E395. DOI: http://dx.doi.org/10.5489/cuaj.4305

86. Osmond A, Ashok D, Francoeur CA, Miller M, **Walsh JC**. *Is focal active colitis of greater clinical significance in pediatric patients? A retrospective review of 68 cases with clinical correlation.* Hum Pathol, 2018 Jan 20. DOI: 10.1016/j.humpath.2018.01.012. PMID: 29360496.

87. Pena AM, Chen S, Feng B, Cai L, Li X, Liang G, **Chakrabarti S**. *Prevention of Diabetic Nephropathy by Modified Acidic Fibroblast Growth Factor.* Nephron. 2017 Jul 29. DOI: 10.1159/000478745. [Epub ahead of print]. PMID: 28768285.

88. Plouffe RA, **Hammond R**, Goldberg HA, Chahine S. *What Matters from Admissions? Identifying Success and Risk Among Canadian Dental Students.* J Dent Educ. 2018 May;82(5):515-523. DOI: 10.21815/JDE.018.057. PMID: 29717076

89. Prasad C, Napier MP, **Rupar CA**, Prasad C. *Fumarase deficiency: A Rare Disorder on the Cross Roads of Clinical & Metabolic Genetics, Neurology and Cancer.* Dysmorphology. Clin Dysmorphol. 2017 Apr;26(2):117-120. DOI: 10.1097/MCD.0000000000000148. PMID: 27541980.

90. Qadri SM, Bissinger R, **Solh Z**, Oldenborg PA. *Eryptosis in health and disease: A paradigm shift towards understanding the (patho)physiological implications of programmed cell death of erythrocytes.* Blood Rev. 2017 Nov;31(6):349-361. DOI: 10.1016/j.blre.2017.06.001. Epub 2017 Jun 17. PMID: 28669393

91. Rakovitch E, Nofech-Mozes S, Hanna W, Sutradhar R, Gu S, Fong C, **Tuck A**, Youngson B, Miller N, Done SJ, Chang MC, Sengupta S, Elavathil L, Jani PA, Bonin M, Lalani N, Paszat L. *Omitting radiation therapy after lumpectomy for pure DCIS does not reduce the risk of salvage mastectomy.* Breast. 2018 Feb;37:181-186. DOI: 10.1016/j.breast.2017.07.002. Epub 2017 Aug 3. PMID: 28781102.

92. Remington L, Isaacs A, Vickers D, **Fuller J**, and Smith S. *Epidemiology of candidemia at a tertiary Canadian hospital 2004-2013.* J. Assoc Med Microbiol Infect Dis. 2018 March 12;3.1:14-23.

93. Rutledge AB, McLeod N, Mehan N, Regan TW, **Ainsworth P**, Chong P, Doyle T, White M, Sanson-Fisher RW, Martin JM. *A clinician-centred program for behaviour change in the optimal use of staging investigations for newly diagnosed prostate cancer.* BJU Int. 2018 May;121 Suppl 3:22-27. DOI: 10.1111/bju.14144. Epub 2018 Feb 16. PMID: 29359883.

94. Schenkel LC, Aref-Eshghi E, Skinner C, **Ainsworth P**, **Lin H**, Paré G, Rodenhiser DI, Schwartz C, **Sadikovic B**. *Peripheral blood epi-signature of Claes-Jensen syndrome enables sensitive and specific identification of patients and healthy carriers with pathogenic mutations in KDM5C.* Clin Epigenetics. 2018 Feb 14;10:21. DOI: 10.1186/s13148-018-0453-8. eCollection 2018. PMID: 29456765.

95. Shirley B, Li Y, **Knoll JHM**, Rogan PK. *Expedited radiation biodosimetry by automated dicentric chromosome identification and dose estimation,* J Vis Exp. 2017 Sep 4;(127). DOI: 10.3791/56245. PMID: 28892030.

96. Singh SS, Pilkerton CS, Shrader CD Jr, **Frisbee SJ**. *Subclinical atherosclerosis, cardiovascular health, and disease risk: is there a case for the Cardiovascular Health Index in the primary prevention population?* BMC Public Health. 2018 Apr 2;18(1):429. DOI: 10.1186/s12889-018-5263-6. PMID: 29609588.

97. **Solh Z**, Brouwers M, Florez ID. *Knowledge translation in transfusion medicine. Part 1: The basics and the frameworks.* Transfusion. 2018 Jan 30. DOI: 10.1111/trf.14487. [Epub ahead of print]. PMID: 29383724.

98. **Solh Z**, Brouwers M, Florez ID. *Knowledge translation in transfusion medicine. Part 3: Interventions and tools.* Transfusion. 2018 Apr 17. DOI: 10.1111/trf.14653. [Epub ahead of print]. PMID: 29667202.

99. Sullivan R, Mc Girr R, Hu S, Tan A, Wu D, Charron C, Lalonde T, **Arany E**, **Chakrabarti S**, Luyt L, Dhanvantari S. *Changes in the cardiac GHSR1a-Ghrelin system correlate with myocardial dysfunction in diabetic cardiomyopathy in mice.* Journal of the Endocrine Society, https://doi.org/10.1210/js.2017-00433.

100. Sullivan R, McGirr R, Hu S, Tan A, Wu D, Charron C, Lalonde T, Arany E, **Chakrabarti S**, Luyt L, Dhanvantari S. *Changes in the Cardiac GHSR1a-Ghrelin System Correlate With Myocardial Dysfunction in Diabetic Cardiomyopathy in Mice.* J Endocr Soc. 2017 Dec 28;2(2):178-189. DOI: 10.1210/js.2017-00433. eCollection 2018 Feb 1. PMID: 29450407

101. Tarnopolsky MA, Sundaram ANE, Provias J, Brady L, **Sadikovic B**. *CPEO - Like mitochondrial myopathy associated with m.8340G>A mutation.* Mitochondrion. 2018 Mar 6. pii: S1567-7249(17)30331-8. DOI:10.1016/j.mito.2018.02.008. [Epub ahead of print]. PMID: 29501485.

102. Taylor R, Alyamany B, Pandey S, Kertesz A, **Ang LC**, Finger E. *Two Distinct Clinical Phenotypes in a Family with ALSP Caused by a Novel CSF-1R Mutation.* (P2.176) Neurology April 10, 2018; 90 (15 Supplement)

103. Thomas AA, Feng B, **Chakrabarti S**. *ANRIL regulates production of extracellular matrix proteins and vasoactive factors in diabetic complications.* Am J Physiol Endocrinol Metab. 2018 Mar 1;314(3):E191-E200. DOI: 10.1152/ajpendo.00268.2017. Epub 2017 Nov 7. PMID: 29118015

104. Thwaites M J, **Cecchini MJ**, Talluri S, Passos DT, Carnevale J, Dick FA. *Multiple molecular interactions redundantly contribute to RB-mediated cell cycle control.* Cell Div. 2017; 12: 3. PMCID: PMC5348811 DOI: 10.1186/s13008-017-0029-6.

105. Tong J, Fitzmaurice PS, Moszczynska A, Rathitharan G, **Ang LC**, Meyer JH, Mizrahi R, Boileau I, Furukawa Y, McCluskey T, Sailasuta N, Kish SJ. *Normal glutathione levels in autopsied brain of chronic users of heroin and of cocaine.* Drug Alcohol Depend. 2018 Jun 23;190:20-28. DOI: 10.1016/j.drugalcdep.2018.05.021. [Epub ahead of print] PMID: 29960919

106. Tong J, Rathitharan G, Meyer JH, Furukawa Y, **Ang LC**, Boileau I, Guttman M, Hornykiewicz O, Kish SJ. *Brain monoamine oxidase B and A in human parkinsonian dopamine deficiency disorders.* Brain. 2017 Sep 1;140(9):2460-2474. DOI: 10.1093/brain/awx172. PMID: 29050386

107. Tsoi VK, **Bhayana V**, Bombassaro AM, Tirona R, Betchen D, Kittanakom S. *Falsely Elevated Vancomycin Concentrations in a Patient Not Receiving Vancomycin.* Canadian Journal of Hospital Pharmacy; 2018. p. 58.

108. **Walsh JC**, Padgett J, **Weir MM**, et al. *Comparing Perceptions of Pathology as a Medical Specialty between Canadian Pathologists and Pre-clinical Medical Students.* Med.Sci.Educ. (2018). https://doi.org/10.1007/s40670-018-0596-4

109. Wang L, Huang Z, Huang W, Chen X, Shan P, Zhong P, **Khan Z**, Wang J, Fang Q, Liang G, Wang Y. *Inhibition of epidermal growth factor receptor attenuates atherosclerosis via decreasing inflammation and oxidative stress.* Sci Rep. 2017 Apr 4;8:45917. DOI: 10.1038/srep45917. PMID: 28374780.

110. Warners MJ, Ambarus CA, Bredenoord AJ, Verheij J, Lauwers GY, **Walsh JC**, Katzka DA, Nelson S, van Viegen T, Furuta GT, Gupta SK, Stitt L, Zou G, Parker CE, Shackelton LM, D Haens GR, Sandborn WJ, Dellon ES, Feagan BG, Collins MH, Jairath V, Pai RK. *Reliability of Histologic Assessment in Patients with Eosinophilic Oesophagitis.* PMID: 29460418.

111. Yan B, Feagan B, Teriaky A, Mosli M, Mohamed R, Williams G, Yeung E, Yong E, **Haig A**, Sey M, Stitt L, Zou GY, Jairath V. *Reliability of EUS indices to detect inflammation in ulcerative colitis.Gastrointest Endosc.* 2017 Jul 29. pii: S0016-5107(17)32158-2. doi: 10.1016/j.gie.2017.07.035. [Epub ahead of print]. PMID 28760533

112. Yousef PG, **Gabril MY**. *An update on the molecular pathology of urinary bladder tumors.*Pathol Res Pract. 2018 Jan;214(1):1-6. DOI: 10.1016/j.prp.2017.11.003. Epub 2017 Nov 10. PMID: 29254798.

113. **Zhang Q**, Shibani A, **Sadikovic B**, **Howlett CJ**, **Ang LC**. *An aggressive multifocal primary CNS histiocytosis with PTPN11 (Shp2) mutation.* Neuropathol Appl Neurobiol. Letter. 2018 Feb;44(2):240-243. DOI: 10.1111/nan.12404. PMID: 28403515.

114. Zhao X, Sehgal M, Hou ZF, Cheng JJ, Shu SN, Wu S, Guo F, Le Marchand SJ, **Lin HX**, Chang J, and Guo JT. *Identification of residues controlling restriction versus enhancing activities of IFITM proteins on the entry of human coronaviruses.* Journal of Virology, 2018, Feb 26;92(6). DOI: 10.1128/JVI.01535-17. PMID:29263263.

115. Zhou H and **Fuller J**. *Recurrent Echinocandin-resistant Candida glabrata candidemia following prolonged micafungin treatment for multiple intra-abdominal abscesses: A case report.* J. Assoc Med Microbiol Infect Dis. 2018 Apr 17;3.1:52-55.

116. Zhuge W, Chen R, Guo G, Dong X, **Khan Z**, Sun X, Dai X, Chen X, Bao M, Shen X, Liang G. *Costunolide specifically binds and inhibits thioredoxin reductase 1 to induce apoptosis in colon cancer.* Cancer Lett. 2018 Jan 1;412:46-58. DOI: 10.1016/j.canlet.2017.10.006. Epub 2017 Oct 13. PMID: 29037867.

117. Zou C, Li W, Li J, **Khan ZA**, Pan Y, Wu X, Yin H, Wang J, Zheng C, Liang G. *11β-HSD1 inhibition ameliorates diabetes-induced cardiomyocyte hypertrophy and cardiac fibrosis through modulation of EGFR activity.* Oncotarget. 2017 Oct 24;8(56):96263-96275. DOI: 10.18632/oncotarget.22015. eCollection 2017 Nov 10. PMID: 29221204.

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