Research Spotlight

HANNAH WEN, MD, PhD

Hannah Wen, MD, PhD, first came to Memorial Sloan Kettering Cancer Center as a fellow in 2008 before joining the Breast team in 2010. When she talks about her work, especially her research, she sounds as enthusiastic as if it were her first day of fellowship.

“I love research! My clinical work is mostly breast cancer diagnosis, so I’ll do research late in the day or come in on weekends,” she says. “When you have such a rich environment, so many cases, and good technology, it’s satisfying and fun.”

Dr. Wen’s projects include studies on triple negative breast cancer, tumor infiltrating lymphocytes, and more.

Triple Negative Breast Cancer

Dr. Wen’s research interest is in triple negative breast cancer (TNBC), defined as breast cancer that does not express estrogen receptor (ER), progesterone receptor (PR), and HER2. Usually high grade with aggressive clinical behavior, TNBC constitutes one of the most challenging groups of breast cancers due to the lack of an effective targeted therapy.

In a study published in *Modern Pathology*, Dr. Wen and colleagues investigated the genetic alterations in TNBC using the MSK-IMPACT assay and correlated mutation profile with detailed histologic analysis. The study identified the most common somatic mutations in TNBC. The study also found that TNBC with apocrine differentiation constitutes a distinct subset, characterized by a high frequency of PI3K pathway alterations similar to luminal subtypes of breast cancer.

Special Histological Subtypes

Triple negative breast cancer isn’t one type, but rather a heterogeneous group of breast cancers that don’t have ER/PR/HER2 expression. According to the World Health Organization classification, there are more than 17 special histologic subtypes of breast cancer. Some special histologic subtypes are triple negative but indolent.

“For diagnosis, it’s important to recognize those that are indolent because they might not need the same treatment as the usual triple negative breast cancer,” Dr. Wen explains.

She is working closely with Jorge Reis-Filho, MD, PhD, Director of Experimental Pathology, to characterize these special histological subtypes, some of which have distinct genomic alterations. Metaplastic breast carcinoma (MBC) for instance, is a rare and aggressive disease that tends to be triple negative. Drs. Wen, Reis-Filho, and other collaborators sought to define somatic alterations and mutational signatures of MBCs.

They compared the genomic landscape of MBCs with triple-negative invasive ductal carcinomas and assessed WNT and PI3K/AKT/mTOR pathway activity. Among their findings, MBCs were genetically complex and tended to have a high frequency of PI3 kinase and WNT signaling pathways alterations. That’s unusual for a triple-negative disease and good news from a treatment perspective, since they’re targetable alterations.

Tumor Infiltrating Lymphocytes

Dr. Wen’s work on tumor infiltrating lymphocytes, which are usually seen in triple negative breast cancer and HER2-positive cancer, shows promise for near-term clinical applications. “We believe those lymphocytes play an important role in the immune system, helping our body to defend against tumor cells,” Dr. Wen says. “They’re a good sign, a predictor of better response to neoadjuvant systemic therapy and a better prognosis.”

For one of her projects, she says she was honored to collaborate with medical oncologist Larry Norton, MD, Medical Director of the Evelyn H. Lauder Breast Center. They examined genomic alterations of tumor-associated leukocytes in breast cancers, suspecting these had alterations that played a role in disease development, just as the tumor cells do.

Dr. Wen explains the technical approaches: “We isolated tumor-associated leukocytes from fresh tumor samples using fluorescent activated cell sorting, performed targeted capture sequencing and whole-exome sequencing analysis in the sorted tumor-associated leukocytes, and compared the mutation profile with that in laser-capture microdissected tumor cells and circulating blood cells.”

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Hannah Wen, MD, PhD, Tackles Tough Breast Cancers

By Hope Cristol
Robert Soslow, MD, Director of Gynecologic (GYN) Pathology, has spent much of his career studying endometrial carcinomas, particularly papillary serous carcinomas and mesenchymal neoplasms. “I think when people think of me, they think of me as an endometrial guy,” he says. In the past few years, however, he’s taken on an entirely new research challenge. He hopes to scrap the 2014 World Health Organization [WHO] classification for endocervical cancer and help establish “a much better” alternative for pathologists.

Although Dr. Soslow routinely handles diagnostic specimens from the cervix, they hadn’t piqued his research interest until relatively recently. Partly he credits his GYN colleague Kay Park, MD, who has long been dedicated to cervical pathology research. “She has truly inspired me and has been a coauthor on all my work in this area,” Dr. Soslow says.

Another reason for his shift in focus? Like any great pathologist, he can’t resist a challenge. When Dr. Simona Stoînicu, his friend and research collaborator in Romania, suggested they take on a big project on the cervix, he was in. With a host of other colleagues, they have been working to establish and validate the novel, proposed International Endocervical Adenocarcinoma Criteria and Classification (IECC) system, which is based on stromal invasion pattern, stratifies these lesions into three categories corresponding to risk of metastasis and recurrences. The researchers found the Silva system was effective at identifying patients at lowest risk of metastasis in HPV-associated endocervical adenocarcinomas. However, the researchers also found that Silva is not applicable to HPV-unassociated adenocarcinomas.

As the American Journal of Surgical Pathology published a paper that examined whether the Silva classification system can be applied to all endocervical adenocarcinomas. The system, which is based on stromal invasion pattern, stratifies these lesions into three categories corresponding to risk of metastasis and recurrences. The researchers found the Silva system was effective at identifying patients at lowest risk of metastasis in HPV-associated endocervical adenocarcinomas. However, the researchers also found that Silva is not applicable to HPV-unassociated adenocarcinomas.

Gastric type morphology. Misdiagnosis of gastric-type cervical adenocarcinomas is common, in part due to lack of awareness of its morphology. A paper published in May in the International Journal of Gynecological Pathology characterized morphologic features using surgical biopsy and cytology specimens, which can be used with ancillary studies to improve diagnostic accuracy. Biopsies showed pale or foamy cytoplasm and well-defined cytoplasmic borders, nuclei exhibited mild-to-moderate pleomorphism with small nucleoli. Cytology revealed tumor cells with pale, foamy, and/or vacuolated cytoplasm and well-defined cytoplasmic borders. Nuclei were moderately pleomorphic, with one or more nucleoli.

WHAT’s IN A NAME?

Today, non-HPV-related tumors represent only about 15% of endocervical adenocarcinomas. The number is expected to rise as HPV-related cases decline due to better screening methods and the HPV vaccine.

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Adenocarcinomas. Examples include:

- Interobserver reproducibility of the IECC system
- Silva classification
- P53 immunohistochemistry negative
- Chemorefractory
- Significant risk of recurrence
- Worse 5-year survival rates

WHAT’s IN A NAME?

Do you know why gastric-type adenocarcinomas of the cervix are so named?

“It’s because these tumors have the same kind of mucin in their cytoplasm as you would find in the pylorus of the stomach,” Dr. Soslow says. Here are some other things to know about these recently described tumors, compared to the usual type endocervical adenocarcinomas.

- More aggressive
- HPV unassociated
- P53 immunohistochemistry negative
- Chemorefractory
- Significant risk of recurrence
- Worse 5-year survival rates

WHEN TO USE IN-SITU HYBRIDIZATION TO CONFIRM HPV

If you need to confirm HPV infection you have two options. The first is p16 immunohistochemistry. The stain can indicate infection, but it’s not entirely specific and does not indicate whether HPV is in the cells. It’s more of a surrogate marker for HPV,” Dr. Park explains.

The second option is in-situ hybridization, an assay that recognizes the HPV genome.

In a study published this year in The American Journal of Surgical Pathology, Drs. Soslow, Park, and others directly compared the methods to confirm the presence of HPV. The researchers found that in-situ hybridization was slightly more sensitive and much more specific than the p16 stain.

“We were the first to do a discipline comparison between these,” Dr. Soslow says. “Now our go-to first step [to identify cells with HPV] is the in-situ hybridization assay rather than the p16.”
THE EVOLUTION OF MSK’S PATHOLOGY FELLOWSHIP PROGRAM

The MSK Pathology Fellowship Program has changed in ways large and small over the years. Pathology’s Director of Education, Kay Park, MD, is in a unique position to highlight key improvements.

By Hope Cristol
Excellence as a pathologist doesn’t always translate to excellence as an educator. Kay Park, MD, aims to change that in her new role as Director of Education. She is working to ensure that fellows at MSK are given more than just a top-notch education at one of the world’s best cancer centers. She hopes to begin a series of faculty development lectures, working in conjunction with Monika Shah, MD, Chair of the Graduate Medical Education Committee at MSK, targeting areas like communication and feedback, burnout, wellness, and physician suicide.

“As a fellow during each subspecialty rotation, you are learning from the best of the best, thought leaders in their fields, those who write the books,” Dr. Park says.”

Matthew G. Hanna, MD, talks about his experience at MSK.

“I originally started at MSK as a medical student, which is unusual. They don’t typically have a lot of medical students that rotate through the Pathology Department. I guess it was a stroke of luck that when I applied to a pathology elective, I was able to spend a month here. I rotated through the different subspecialties, interacted with different fellows, and felt comfortable and bonded with a lot of the faculty. I was at Mount Sinai for my anatomic and clinical pathology residency, and Pittsburgh for my first fellowship, which was in informatics. Then I came here for the oncological surgical pathology fellowship. I recently completed it and am staying on as junior faculty, splitting my time between the Breast Pathology Team and informatics. One of the things I say is that if you don’t ask you won’t find out, if you don’t try you’ll never know. I actually wanted to be a surgeon. My first experience with pathology was going to the lab to see what a specimen looks like downstream – because great surgeons are knowledgeable about that. It would have been a complete mistake if I hadn’t ventured off to pathology and taken electives in it. The moral of the story: Put yourself out there and never knock something out of consideration unless you’ve experienced it yourself.

For anyone considering a Pathology fellowship, I would say the fellowship here will mold you into the best academic pathologist you could ever try to be.”

Matthew G. Hanna, MD
My favorite thing about the fellowship here is how passionate all the attendings are when teaching during sign-out. That passion is contagious and makes me want to learn as much as I can in each subspecialty.

- Nicholas Bercovici

This is a top-notch program in terms of clinical cases and faculty. The cases we see here, you will not see anywhere else with that frequency. The faculty are leaders in their field and are actively engaged in teaching and clinical research.

- Pavel Kopach

My favorite part of the fellowship so far has been how humbling this experience is. Everyone is so knowledgeable, yet so friendly and grounded. They treat the fellows with respect and collegially and really care about our education. The amount of cutting-edge knowledge and experience the surgical pathology fellows will gain in one year is invaluable.

- Rami Alhassan, MD

My favorite thing about my fellowship at MSK is the people with whom I get to work and knowing my patients are getting the best medical care available anywhere.

- Brie Kezlarian

View from the Top: Fellowship Pros and Cons

The Oncological Surgical Pathology fellowship is extremely valuable on its own, regardless of whether fellows go on to a subspecialty fellowship. Yet it’s not always easy to recruit young doctors to the general surgical pathology fellowship.

“We have to get 17 really good people committed to coming here for a year and working really hard,” Dr. Park says.

Other recruiting challenges, regardless of the type of Pathology fellowship: New York City is not an easy place to live, especially if you’re far from family. Also, Dr. Park says, the MSK Pathology fellowships are very rigorous and balancing work and life can be challenging.

Yet Dr. Park says there’s no question that choosing a Pathology fellowship at MSK is worth every sleepless night, every diagnostic frustration.

“Every single fellow who graduates from here has always told me the same thing: What you learn here is beyond what you learn anywhere else,” Dr. Park says. “They’ve also learned how to deal with all kinds of issues and problems. They’ve been through the trenches, and now nothing scares them. They can tackle anything that comes their way.”

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Less Time Grossing

Any Pathology fellowship at MSK is incredibly challenging. Dr. Park has never made light of that when communicating with prospective fellows. “I tell them how hard they’ll be working. It took me a full year after my fellowship to catch up on my sleep,” she says.

Fellows also have incredible access to the department’s resources, from its prominent pathologists to the tools they use, from MSK-IMPACT data to countless interesting clinical cases. “By the time they graduate this fellowship, they may have seen more cases of a specific type of specimen or tumor than practicing community pathologists have seen in five years,” says Dr. Murray.

Unfortunately, MSK used to have a lot of a shadow over its hard work-high reward reputation. It was once a grossing-heavy fellowship, which became a deterrent to some fellowship candidates. The department made a concerted effort to change that.

One solution was to hire more Pathologist Assistants (PAs) to do most of the grossing. Prior to 2012, there were about seven PAs today there are 14 PAs who cover three sites: Main Campus, MSK Monmouth, and the Josie Robertson Surgery Center.

Further, the grossing that fellows do today is more interesting and less onerous than in the past. “The fellows only gross about three weeks out of the year, and maybe five or six specimens during the day,” they’re usually large, complex specimens, as opposed to all the lymph node dissections and lumpectomies that are often rote and less onerous than in the past. “The fellows only gross about three weeks out of the year, and maybe five or six specimens during the day.”

More Molecular Training

“With all the molecular technology that’s ramping up at lightspeed, that’s become an important part of fellowship education. We are trying to incorporate it more and more,”Dr. Park says.

The discussions at sign out have been moving toward...
understanding the molecular underpinnings of cancer, and knowledge from The Cancer Genome Atlas (TCGA) and MSK-IMPACT are being incorporated in diagnoses. “This information is becoming increasingly more important in classifying tumors, as well as prognosticating and guiding therapy,” Dr. Park says.

While all fellows will gain knowledge about molecular diagnostic pathology, a few will subspecialize in it. The Molecular Diagnostic Service (MDS) offers five Molecular Genetic Pathology Fellowship positions, and more will likely be added in the future. This is not only an effort to train future molecular pathologists, but also to keep up with the pace of demand of MDS.

What Hasn’t Changed

Whether graduating fellows stay at MSK, join the world of academia, go into community practice, or pursue other Pathology-related paths, graduates of this fellowship are uniquely prepared.
Nearly two hundred people have graduated from the cytotechnology training program at MSK since its official launch in 1961. Mary Ann Friedlander, the Pathology Department’s Quality and Regulatory Manager, is a graduate, instructor, and former program director for the school (which is now the Hunter College Advanced Certificate Cytotechnology Program). She sat down with MSK Pathology Review to talk about the education, experience, and opportunities it provides.

What can a prospective student expect from the program?

The program feels like an internship or a year of on-the-job training. Students are embedded in the day-to-day operations of the laboratory from the very beginning and get a good sense of the work of a cytotechnologist at MSK.

Our students are exposed to rare and unusual tumors that they may not otherwise see in other programs or clinical laboratory environments. Students also benefit from the MSK cytotechnologists, cytopreparatory technicians, and cytopathologists who all play a role in the educational program.

Tell me about the career possibilities for graduates.

MSK graduates have historically obtained employment before or soon after graduation from the program. Most graduates obtain positions as staff cytotechnologists in either a hospital or commercial cytology laboratory. Over time, some cytotechnologists decide to further their careers as a laboratory supervisor/manager. Some decide to work in private industry for companies that develop technologies in cytopathology. Many cytotechnologists go back to school for an advanced degree or additional certification as a specialist cytotechnologist.

In some laboratories, cytotechnologists are also “physician extenders.” They have been trained to assist pathologists in other areas including: morphologic assessment of FISH/CISH; pre-screening of AFB stains performed on tissue preparations; quantitation of HER-2, Ki-67, ER and PR IHC performed on histologic preparations via manual or digital image analysis; and estimation of tumor volume and purity in tissue samples submitted for molecular testing. Involvement in these additional areas is dependent on the needs and training resources of the institution or laboratory.

Looking back on your time in the program, what stands out in your memory?

The training at MSK was memorable. Students studied alongside pathologists who were at the forefront of cytology...
The post-baccalaureate Hunter College Advanced Certificate in Cytotechnology program is an extensive 1-year program taught entirely at MSK. The current curriculum of didactic and microscopic instruction includes:

- **Gynecologic Cytopathology**
  Students are introduced to the principles of normal and abnormal gynecologic cytopathology.

- **Microscopic Evaluation 1, 2, and 3**
  Students become proficient at microscopic screening and correlating microscopic findings with clinical information, history, and concurrent histologic specimens.

- **Exfoliative Cytopathology 1 and 2**
  Students learn non-gynecologic, exfoliative cytopathology including anatomy, embryology, histology, and physiology.

- **Research Methods 1, 2, and 3**
  Teaches principles of experimental design, lab techniques, and data collection and interpretation.

- **Cytoreparatory Techniques 1, 2, and 3**
  Students master smear preparation, cytocentrifugation, pipetting, liquid-based processing, staining, and coverslipping.

- **Fine Needle Aspiration (FNA) Cytology 1 & 2**
  Students assess FNA specimens from numerous sites, including lung, breast, thyroid, salivary gland, liver, and pancreas.

- **Cytology Laboratory Management and Operations**
  Exposes students to regulatory and accreditation requirements that impact cytology practice, laboratory safety, quality assurance, digital pathology, billing/coding practices, and more.

Students shadow cytotechnologists during FNA/biopsy procedures. They learn how to prepare and stain a FNA smear preparation and microscopically determine if a sample is adequate. With this experience, students get out from behind the microscope, interact with other healthcare professionals, and see the impact of cytology within the healthcare system.

“Our students are exposed to rare and unusual tumors that they may not otherwise see in other programs or clinical laboratory environments.”

**How and when did the program become a collaboration with Hunter College?**

In 2005, Education Law Article 165 was passed in New York State (NYS). The law requires licensure of cytotechnologists and stipulates requirements for cytotechnology training programs, including requisite coursework and registration with NYS Department of Education (NYSED) as an academic credit-bearing training program. In response to these new requirements, our School of Cytotechnology reached out to the City University of New York – Hunter College Medical Laboratory Sciences Department to explore a collaborative training program. With perseverance, the affiliation and collaborative agreements were developed and signed between these two institutions. NYSED approved the new Hunter College Advanced Certificate in Cytotechnology Program in June 2014. Although now a Hunter College program, it remains a post-baccalaureate certificate program that is taught on-site at MSK, by MSK staff.
MOLECULAR DIAGNOSTICS: 9 Facts and Firsts

By Hope Cristol

The Molecular Diagnostic Service (MDS) is crucial to clinical and research efforts at MSK. It was established in 2006 through the consolidation of three pre-existing clinical laboratories: the Laboratory of Diagnostic Molecular Pathology (DMP), for tumor genetic testing; the Laboratory of Diagnostic Molecular Genetics (DMG), for germline genetic testing; and the Laboratory of Clinical Cytogenetics; with Marc Ladanyi, MD, as its chief. While the activities of the three components (especially DMP and DMG) have become more highly integrated, the old designations have persisted as a useful shorthand for these different activities of MDS.

Pathologists far and wide know about MSK-IMPACT, a groundbreaking, tumor-profiling multiplex panel that looks for abnormalities in hundreds of cancer-related genes. However, there’s so much more to MDS – some of which may surprise those in the rest of the Pathology department, from fellows to other service chiefs. Dr. Ladanyi, along with Maria Arcila, MD, Director of DMP, recently shared some of these facts and firsts with MSK Pathology Review.

DR. MARC LADANYI’S EARLY DAYS IN MEDICINE

Dr. Ladanyi is, after all, one of the longest-serving pathologists in our Department. Here are some fun facts about his earliest days in medicine that even his oldest colleagues might not know.

• He completed three fellowships at MSK: surgical pathology, cytogenetics and research.
• He graduated medical school at 23, courtesy of an accelerated program at McGill University in Canada.
• The original roots of the MDS evolved from his early work overseeing clinical molecular testing in the lab of then Cytogenetics Service Chief Raju S. K. Chaganti, PhD.
• As a medical student, he earned the award for being the top student in his pharmacology class. “It might seem paradoxical for somebody who ended up going into pathology, but now what we do is so central to deciding which drug the patient gets,” Dr. Ladanyi says.

Of all the services within Pathology, MDS has the highest proportion of female attendings. “There was no agenda behind it: we just had several excellent female MGP fellows who stayed on and have been successful in recruiting outstanding outside candidates who also happened to be women,” Dr. Ladanyi says.

Fellows are strongly encouraged to write papers, given their access to MSK-IMPACT data and other clinical test data. For instance, last year, fellow Sounak Gupta, MBBS, PhD, mined MSK-IMPACT data with assistant attending pathologist Dara Ross, MD, to write a paper on amplification of PD-L1 in breast cancer. It will soon be published in the Journal of Molecular Diagnostics.

In 2004, the precursor of MDS, the DMP Laboratory, was the first lab in New York State, and one of the first in the country, to have a clinical assay for EGFR mutations in lung cancer.

In 2014, the precursor of MDS, the DMP Laboratory, was the first lab in New York State, and one of the first in the country, to have a clinical assay for EGFR mutations in lung cancer.

In 2014, DMP was the first lab in New York State to get approval for a large-panel NGS assay: MSK-IMPACT.

In 2017, DMP was the first academic lab to have a laboratory-developed tumor profiling assay (again, MSK-IMPACT) cleared by the U.S. Food and Drug Administration.

The world-class clinical bioinformatics group of MDS, led by Ahmed Zehir, PhD, has implemented a bioinformatic algorithm called MSIsensor. It identifies patients with microsatellite instability using MSK-IMPACT data, which can be routinely checked across all cancers. The work was led by MSK computational biologist Sumit Middha, PhD, and molecular and gastrointestinal pathologist Jaclyn Hechtman, MD. This new capability of the MSK-IMPACT test has already become clinically very important, identifying patients eligible for immunotherapy.

DMP was the first lab to obtain New York State Department of Health approval for HER2 status assessment by NGS (via MSK-IMPACT) in breast and gastric cancer. The effort, led by Drs. Ros and Arcila, enables routine screening of all cancer patients for potentially targetable HER2 amplification.

DMP was also the first lab in New York State to validate NGS-based clonality testing for clonal characterization, somatic hypermutation, and MRD assessment, an effort led by Dr. Arcila and molecular geneticist Khoudoudja Nafa, PharmD, PhD.
Research Overview

MICHAEL H. A. ROEHRL, MD, PHD
Inside the Lab of Michael H. A. Roehrl, MD, PhD

By Hope Cristol

Gastrointestinal pathologist Michael H. A. Roehrl, M.D., Ph.D., plays a central role in several initiatives that are bringing us closer to the future of precision healthcare. Dr. Roehrl, who joined the Pathology department in November 2015, is the Director of the Precision Pathology Biobanking Center, an MSK collaborative research center that obtained College of American Pathologists accreditation in 2018, and that includes efforts in big data analytics, development of new pathology technologies, and clinical trials.

He is also Principal Investigator of a research laboratory on the role of proteins in cancer using quantitative biophysical approaches. Dr. Roehrl traces his love for biophysics and protein chemistry back to his days as Ph.D. student at Harvard and MIT where he “spent fun years doing quantum mechanical nuclear spin gymnastics” with proteins and small molecule drug leads. That, of course, is a very simple description for his highly complex research in proteomics, which includes identifying proteomic biomarkers of solid tumors. But Dr. Roehrl can distill his laboratory’s work in a way that just about anyone with an interest in pathology can understand – and get excited about.

He and his research team use a variety of technologies, such as biophysical, biochemical, molecular, and computer science tools, to measure, quantify, and characterize thousands of proteins in parallel. “We are studying various solid tumors, including colon cancer, pancreatic cancer, and a variety of other cancers,” says Dr. Roehrl.

Increasing Knowledge of the Cancer “Antigen-Ome”

One focus of Dr. Roehrl’s lab is the antigen-ome, or “the totality of all proteins that have become visible to the immune system,” he explains. “My lab’s research in this area began in autoimmune disease (like lupus and arthritis), but we soon discovered that the same mechanisms hold for many cancers.” Dr. Roehrl has focused on the mechanisms by which a person’s humoral immune system recognizes various proteins expressed in different cancers. The research could pave the way for using serological of markers of immune induction and immunoproteasome (showing that PSB7 protein levels can be used as an outcome-predictive parameter) and that OLFM4 may be clinically useful in predicting who may benefit from adjuvant chemotherapy and who may not.

Dr. Roehrl is also part of a multinational consortium that investigates the role of immune cell infiltration into cancers (Lancet, May 2018).

Potential role in opportunities for colon cancer diagnosis, molecular classification, and therapy. Most recently, they have found that colon cancers can become immunologically “invisible” by switching off the immunoproteasome (showing that PSB7 protein levels can be used as an outcome-predictive parameter) and that OLFM4 may be clinically useful in predicting who may benefit from adjuvant chemotherapy and who may not.

I have postdocs in my laboratory who are highly motivated and scientifically in their own right, and they do a lot of work that is very labor intensive and sophisticated – protein extractions, running mass spec, etc."

Towards Proteogenomics

Other areas of his laboratory’s research include:
- Directly calling cancer mutations at protein level by informing “proteogenomic” mass spectrometry with next generation DNA/RNA sequencing
- Developing an integrated epigenetic genome enhancer-proteomic approach to cancer subtyping (with Mark Ptashne’s group at SKI)
- Deciphering mechanisms by which cancer cells vary widely in cancerous secretions
- Developing tools and analytics for the large-scale international NIH/NCTI-sponsored Clinical Proteome Tumor Analysis Consortium (CPTAC)

Excitingly, the field is moving forward at fast pace. On Oct. 1, 2018, Dr. Roehrl helped launch the brand new Human Proteome Project Pathology Pillar at the HUPO (Human Proteome Organization) World Congress in Orlando.

Dr. Roehrl makes a point of acknowledging his team, which he says are integral to successful outcomes on many levels - including the essential work of identifying and fixing any mechanical problems with the mass spectrometer, which is crucial to proteomics research. “I am honored to have postdocs in my laboratory who are highly skilled scientists in their own right, and they do a lot of work that is very labor intensive and sophisticated: protein extraction, mass spec, computing/coding, etc.” Dr. Roehrl says.
Memorial Sloan Kettering Cancer Center is renowned as a leader in cancer care and research, but the institution’s excellence is reflected by staff at all levels. Surgical Pathology Laboratory Manager Peter Ntiamoah, PhD, MPH, is no exception.

This year, Ntiamoah completed his PhD in epidemiology; he completed his MPH in 2011. He earned both degrees online, carving out study time in the small hours of the morning – after his three children were in bed, before his alarm went off at 5:30 a.m.

“I was born and raised in Ghana, where academic rigor is part of the system,” Ntiamoah says. “You stay up late, you wake up early, you hit your books.”

Back in Ghana, he studied hard to just make it through high school, where you can’t advance to the next grade level, much less graduate, without a test. Now Ntiamoah is driven by a commitment to patient care and a desire to play a role in reducing cancer rates.

**How did you become a laboratory manager in Pathology?**

After I finished my undergraduate degree in biology in New York at Baruch College, I went on to teach at Baruch College High School. One of my mentors, who was a teacher, recommended me for a job in a reference lab. That was about 18 years ago. I’ve worked in a few different labs since then. I became a supervisor in one of them, then a manager at Quest Diagnostics. I joined MSK as a laboratory manager in 2013.

**What does being a laboratory manager involve?**

Even though I don’t come into contact with patients during my daily activities, they depend on what we do in Pathology. Specimen integrity must be maintained to ensure we are giving an accurate diagnosis to the patient. That is what I do as a lab manager – and part of that involves bringing the most current technology available in the industry to MSK. I also manage 79 employees.

**What are some things you enjoy about your role?**

What I enjoy most is the ability to contribute to patient care. I also look forward to employee engagement. As a manager, I need to motivate my staff and get them highly engaged. That makes them more productive, motivates them to take more responsibility, and helps them enjoy what they’re doing.

**What are some of your engagement strategies?**

Engagement is twofold. One: You want to help your team achieve certain goals, so feedback is important. Two: You have to take interest in their professional development. I have an open-door policy, so if people want to talk about career development, their routine, work they do for patients, to understand certain concepts or how we do certain things, I’m always there to help them.

**Why did you choose to pursue graduate work in public health?**

In 2008, I saw an ad in a journal (CAP Today) that was looking for laboratory technologists to volunteer their time in developing countries. I responded and went to Ghana. When I got there, I realized there were a lot of advanced cancer cases that we don’t see in the United States. I asked the U.S. pathologists I was there with, “What can we do?” They told me there needed to be epidemiological studies to understand more about the environmental factors. That is how I decided to pursue public health.

Now that I have my PhD in epidemiology, I look forward to contributing to research about what we can do to help prevent certain cancers. We don’t exactly know what triggers a gene to turn into cancer, and I am interested in data analysis to look into factors that may initiate carcinogenesis.
Many senior pathologists regard social media engagement as low on their priority list – if it makes the list at all. After all, their schedules are already packed, even overburdened, with clinical work, research, teaching, conferences, and committees.

Nonetheless, social media platforms are becoming increasingly valuable to the field. Pathologists far and wide post images of diverse audience in the loop on pathology experts and research advances. Recent statistics show that 35% of our Twitter followers are pathologists, 18% are former fellows and alumni, 15% are medical students/non-MSK fellows, and 12% are non-Pathology faculty at MSK. (For more details, see pie chart.)

“I’m trying hard to highlight the impressive accomplishments of our faculty and staff and educate our patients about the diagnostic aspects of their care. Social media provides additional opportunities to do that,” Virgo says. “I think that over the next decade, social media platforms will become even more important to connecting pathologists, educating people about pathology, and recruiting future fellows, staff, and faculty.”

By Hope Cristol