Forensic and Investigative Sciences Annual Report 2018-2019
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The Forensic and Investigative Sciences Program at IUPUI was born in 2004. We graduated our first students in 2007. Since then, we have graduated 177 BS students and 51 MS students. In that time, we have grown into cutting-edge teaching labs, complete with all the instrumentation and equipment used in the world’s most competitive forensic labs. Why? Because we are committed to giving our students every opportunity to grow into, embrace and learn the world’s most well-RENOWNED methods and techniques. We look upon our past nostalgically and we live in our present with immense passion. That said, it is my goal to energetically embrace our future by becoming the Top Rated forensic science program in the Midwest. I plan on doing this by encouraging traditional and non-TRADITIONAL opportunities for learning, incorporating research into our curriculum and working with community partners to advance vital research objectives. With the support of our dedicated faculty and staff, as well as the best students in the Midwest, I’m confident we can successfully tackle the challenges of tomorrow.

Thank you to our Board of Visitor members!

Ed Littlejohn
Indiana State Department of Toxicology

Brenda Keller
Indianapolis Marion County Forensic Services Agency

Carl Sobieralski
Indiana State Police
Indianapolis Regional Laboratory

Mark Ahonen
Indiana State Police Laboratory

Judge Cale J. Bradford
Court of Appeals of Indiana

Major Steve Holland
Indiana State Police Laboratory Division

Denise Purdie Andrews
Axis Forensic Toxicology

Frances Watson
School of Law

Bill Gorman
Heritage Research Group

Thomas Stucky
School of Public and Environmental Affairs

Jeremy Wilson
Department of Anthropology

George Sandusky
School of Medicine

Greg Smith
Indianapolis Museum of Art

Sonia J. Leerkamp
Attorney at Law
FIS Undergraduate Students

- California
- Illinois
- Michigan
- Minnesota
- Missouri
- New Mexico
- Ohio
- Pennsylvania
- Texas
- Trinidad & Tobago
- Washington
- Wisconsin
FIS Undergraduate Fall 2018 Term GPA

- A+ (4.0): 10%
- A, A-: 34%
- B+, B, B-: 19%
- C+, C, C-: 25%
- Less than C-: 12%

% of Female Students

- FIS: 82%
- All Science: 55%
Saint Charles County Police Crime Laboratory in Missouri, Summer 2019

I will be working in the Saint Charles Police Crime learning about both Forensic Biology and Forensic Chemistry. I will be using different scientific techniques and machines to help analyze pieces of evidence. They also said that if there was a trial where evidence was being presented that I might be able to attend.

Will County Coroner's Office, Summer 2018

This internship was a great experience that allowed for an alternative perspective to forensic science than a typical internship in a laboratory setting would.

The most significant part of my internship was being allowed to view and even assist in autopsies. The forensic pathologists were eager to help me learn and show me the medical side of forensic science. They showed me how different parts of the human body react after death and indicated things that could be signs of a suspicious death.

During my internship I was allowed to assist in the collection and documentation of information throughout the process of collecting, examining and releasing a body. I feel I handled myself well when assisting in this process. It was interesting to see all of the information that is necessary to compile a death report and prepare a death certificate. I was also able to assist in minor tasks during autopsies such as recording the measurements of internal organs and collecting bodily fluids.

I believe that IUPUI's FIS program prepared me greatly for this internship. The majority of topics that were covered in my first two semesters came up throughout my internship. I do feel that I would have benefited from a human anatomy class, but the staff were more than happy to help explain things when needed.

My only disappointment in my internship was that it ended. I would have loved to be able to extend my internship or even have been on-call with a deputy coroner overnight, but my schedule wouldn't allow it. It was a wonderful educational experience.
I learned a lot during my internship at the Saint Charles County Police Crime Laboratory. It helped confirm my desire to join the forensic science field. The most significant part of the internship for me was shadowing the forensic biology analyst, because this is the position I hope to be in one day. We used black light to examine evidence for semen stains and observed hair evidence under a compound light microscope. The analyst also showed me a case where they used DNA evidence to help identify a deceased body that had been badly burned.

In addition to shadowing, I completed a project where I helped validate a new method for the biologists. They wanted to incorporate a better method for observing acid phosphatase within semen stains. The acid phosphatase (AP test) helps determine whether an evidence stain contains semen by undergoing a specific color change. This test can be completed using different reagents. The reagent I helped validate had a deep purple color change that was more obvious as a positive result than the former method. It produced a color change faster, and it was more specific because it was able to test positive for smaller dilutions of semen within a test sample. In addition I helped calibrate a PH meter for the analysts, explore and observe the chemistry lab, look at the evidence vault, and visit the ballistics room.

I feel IUPUI prepared me well for my internship. The supervisor informed me he was impressed with my knowledge and resume. He also indicated my original knowledge base was the reason he felt comfortable giving me a project to complete while I was within the lab.

These images were taken in the ballistics section of the crime lab. The picture on the left is of the gun tank. It is a metal tank full of water where a gun is fired. The right picture shows how the bullet appears before and after it was fired. It also displays the bullet casings. I was able to observe the lands and grooves on the bullet and determine whether the gun it was fired from was a left or a right-hand twist. I also examined the casings for the impression of the firing pin.

These images were taken when I shadowed the forensic chemistry analyst while she was observing the drug evidence. The left picture is of the drug evidence that is admitted into the lab. The picture on the right was taken after the analyst performed color tests to identify which kind of illegal drug had been admitted.
Undergraduate Program

Eli Lilly & Company Corporate Center,
Summer 2018 & 2019

Last summer I learned so much about corporate America and got to meet people from all over the company alliance managers, scientists, executive officers.

My main job was to extract and analyze data from medical studies. Say there is a study called Nashton2016 made by head scientist Edwin Nashton (made up name). I’d gather the data from it, enter it in a Power Point, and have Dr. Hess check it. Rinse and repeat. It sounds easy but it involved a lot of thinking and following an internal logic when using the PEDRO scale.

I had three projects: data extraction and analysis from clinical studies, project creation in Boston Health Economics-Instant Health Data, and preparation of Lilly's 2018 Relay for Life. Each clinical study was assessed according to the treatments used (biologics, chemotherapies, and radiation), the PEDRO scale, number of patients, and overall and progression free survivals. The Relay required I create ads to be placed around Lilly campus and create social media posts for the event. I also took part in fundraising and awareness efforts both before and during the Relay. The BHE-IHD project required I do practice projects to master the various technical features in the program before creating my very own osteosarcoma project to analyze rates of osteosarcoma in adolescents and adults (along with other patient demographics and the types of drugs used). As I had no previous work with the BHE-IHD tool, this was easily the hardest part of my internship. Still, I learned how to use the tool and made a successful project.

I used previous knowledge in R coding, mathematics, and science (specifically stuff discussed in biology K101 and 103). There were a few new programs I needed to learn and it took me a bit to understand the PEDRO scale (about two weeks), by the start of July I was full steam ahead with everything and getting a great deal of work done.

My internship was the highlight of my summer last year, so I am thrilled to be interning with them again this summer.
Every day I felt like I learned something new at this internship, and it was amazing to see what exactly goes on in a forensic laboratory. The most significant part of my internship was talking with and learning from all of the forensic scientists I came into contact with. They each had different experiences as forensic scientists and were able to give me advice based off of each of those experiences. I was even fortunate enough to be able to talk to scientists in other units and see how what they do every day is similar and different from what the scientists on the drug unit do.

I had an amazing supervisor, Audra Yovanovich, a forensic drug analyst at the lab. She was great at giving me enough instruction to feel comfortable working on a project by myself, but I could always still come to her with questions that came up.

As part of my internship I compiled all of the newly scheduled fentanyl analogs and added these analogs to a database initially by my supervisor. The information added to the database included each fentanyl analog’s name, date the analog became controlled, and the chemical structure of each analog. Besides this project I also had the privilege to experience what court was like, sit in on multiple mock trials, and go to other units to learn how they processed and went through evidence. I enjoyed everyday I spent at the ISP lab and am happy to say I will remain in contact with Audra to help me finish my studies and hopefully find a job in forensics once I graduate.

As a result of my internship, I was given the amazing opportunity to present at the Midwestern Association of Forensic Scientists (MAFS) Annual Meeting hosted in Indianapolis. I was able to sit in on additional presentations and the end of the week round table discussions where drug analysts from all over the Midwest discussed procedures unique to their labs and possible improvements for the future. I appreciate all that I learned from every drug analyst I spoke and listened to.

Summer 2019 Undergraduate Internships

Callista Maguire, FBI, Indianapolis, IN
Molly Pederson, FBI (Weapons of Mass Destruction Directorate), Washington, DC
Danielle Vargas, Will County Sheriff’s Department (CSI), Joliet, IL
Jenna Wade, Mitchell Police Department (Drugs), Mitchell, IN
Elexis Shields, Amanda Siegal Laboratory (Multidisciplinary Undergraduate Research Institute Grant), Indianapolis, IN
KATHERINE KLAMER

**INTERN MAJOR**
Chemistry & Forensic Science

**MENTOR NAME**
Dr. Richard Gregory

**MENTOR DEPARTMENT**
Indiana University School of Dentistry Department of Biomedical & Applied Sciences

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**Anti-Microbial Effects of BHA and BHT on S. mutans Biofilm**

Streptococcus mutans is one of the leading bacterial causes of dental cavities. Substances found in everyday food items, such as sugar or lactose, can help or hinder S. mutans growth. Butylated hydroxytoluene (BHT) and butylated hydroxyanisole (BHA) are two common food preservatives, with trace amounts found in everything from peanut butter to cookies to cereal. Lab experiments were done to determine how BHT and BHA affected the growth rate of S. mutans. Higher concentrations of BHA prevented S. mutans from growing. This shows that BHA is potentially a promising anti-cariogenic (anti-cavity) agent. However, higher levels of BHT merely limited S. mutans growth rather than stopping it.

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MOLLY PEDERSON

**INTERN MAJOR**
Forensic and Investigative Science, Biology, Chemistry

**MENTOR NAME**
Dr. William Thompson

**MENTOR DEPARTMENT**
Department of Physical Therapy, IUPUI School of Health and Human Sciences

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**Osteocyte-Specific and Global Deletion of the α2β1 Auxiliary Voltage Sensitive Calcium Channel Subunit**

Previous studies indicate that applying mechanical force to the skeleton causes an influx of calcium into bone cells, which helps build new bone. Osteocytes are the bone cells responsible for the translation of these mechanical forces into the formation of new bone, and calcium channels in these bone cells play a critical role in bone formation. The focus of the research I have assisted with this year centered around a specific auxiliary subunit of voltage-sensitive calcium channels called α2β1 in osteocytes, and how α2β1 plays a role in the response to mechanical forces in terms of bone formation. Mice were used as the model organism and were analyzed using a variety of techniques and instrumentation including loading of bone scans with a Faxitron, in vivo tibial loading with an EndurA Tec ELF 3200, and in vivo microCT scans with a Skyscan. It was hypothesized that removing α2β1 in osteocytes would impair skeletal development and decrease bone formation in response to mechanical forces. Preliminary results indicate that there are no significant differences in skeletal development between normal mice and those lacking the α2β1 in osteocytes. Responses to mechanical forces are currently being analyzed and are expected to reveal differences between normal mice and those lacking α2β1 in osteocytes.
JOCELYN BLACKBURN

INTERN MAJOR
Forensic Science and Biology

MENTOR NAME
Dr. Alam

MENTOR DEPARTMENT
Endocrinology Department through
Indiana University School of Medicine

Lysosomal trafficking pathways in the development of ADO2 in mice

Osteopetrosis is a devastating rare bone and mineral disease that causes frequent fractures, intense pain, loss of vision, and even bone marrow failure in severe cases. This disease, characterized by abnormally dense bones and narrow marrow space, is estimated to affect 20,000 people in the United States. Unfortunately, there is no cure for osteopetrosis, very little in the way of effective treatments, and an immense amount to learn about the biological mechanisms of this disease. Through creating mouse models of Autosomal Dominant Osteopetrosis type II (ADO2), Dr. Econs’ Endocrinology lab is working hard to find much needed answers. Research has shown that osteoclasts, the bone cells responsible for cell remodeling, have defective ruffled borders in diseased cells. Diminished ruffled borders decrease the efficiency of bone cell resorption, thus causing the myriad of adverse symptoms of this disease. Moreover, lysosomal trafficking pathways are vital in most cells, especially in osteoclasts, because they are thought to significantly participate in ruffled border formation. In this study, we tested a variety of genes involved in the osteoclast lysosomal trafficking pathways. Bone marrow was harvested from a total of twelve wild-type and osteopetrotic mice and used to grow osteoclasts in cell culture. RNA was then extracted from the cells and transcribed into cDNA, which was analyzed via real-time PCR. The mRNA expression of each gene of interest was compared in wild-type and diseased cells to determine their significance in ruffled border formation, and thus provide vital insight about this rare, yet debilitating disease.

SKILLS
THE INTERN WILL DEMONSTRATE CAREER-RELATED OR RESEARCH-SPECIFIC SKILLS.

IDENTITY
THE INTERN WILL FORMULATE AN EARLY PROFESSIONAL IDENTITY.

GOALS
THE INTERN WILL EXPLAIN AND ANALYZE HIS OR HER CAREER GOALS.

EMILY HULSEY

INTERN MAJOR
Forensic Biology, Forensic Chemistry, Biology, Chemistry

MENTOR NAME
Dr. George Sandusky

MENTOR DEPARTMENT
Department of Pathology and Laboratory Medicine

Using Whole Slide Digital Imaging for Detection of Early Development of Lung Cancer in a Mouse Model

Lung cancer is the second leading cause of death in the United States among men and women. The expected outlook of lung cancer for 2019 is 228,150 new cases and 142,670 deaths. One of the most common forms is Squamous Cell Carcinoma (SCC), a type of non-small cell cancer that is found near the center of the lungs. There are four stages leading up to the development of the cancer that occur in the airways. The first is metaplasia, or the transfiguring of respiratory airway cells into squamous-like cells, causing the cilia present to be wiped out. The particulate substances inhaled into the lungs are carried into the alveoli and cause chronic respiratory diseases, such as pneumonia, and ultimately lead to COPD and cancer. The next stage is low grade dysplasia, the disorganization of squamous epithelium cells, followed by high grade dysplasia; the piling up of disorganized cells. This progresses into the development of tumor cells.

This project followed the progression of SCC in a mouse model that resembles SCC in man. These mice were treated to induce cancer progression. We evaluated histologic sections of the lungs from these animals and quantitated the numbers of metaplasia, low and high grade dysplasia, and SCC.

The highest occurrence was metaplasia, followed by low grade and high grade dysplasia, and SCC tumor. The tumors were found in 21.7% of the mice. This mouse model is representative of the long term changes, which take about 30-35 years to develop, as seen in man.
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**FIS Undergraduate Research**
FIS Students in Dr. George Sandusky Research Group Presenting at the American Association for Cancer Research Conference

Calli Maguire

Dr. George Sandusky

Max Jacobsen

Emily Hulsey

Gariela Ovalle
Forensic Science Club
This year, the Forensic Science Club at IUPUI is excited to state that it was a good year for the organization. The club participated in several on-campus and off-campus outreach events often promoting STEM careers to school-age children and incoming IUPUI students. We took steps to improve membership recruitment and retention with successful results.

Off-Campus Events

Celebrate Science: Members volunteered with Dr. Christine Picard and her lab at Celebrate Science on October 6 helping at her Maggot Art table. Attending children were able to use maggots to paint.

Circle the City hosted by Girl Scouts of America: Held at the Indianapolis State Museum on October 20. The Forensic Science Club had a fingerprinting booth. Members of the Girl Scouts came to learn about fingerprints, their application to forensic science, and information about IUPUI’s Forensic and Investigative Sciences Program. This was a successful event with several hundred attendees.

National Chemistry Day at the Indianapolis Children’s Museum: An event the club participates in every year is National Chemistry Day at the Indianapolis Children’s Museum. This year it took place on November 3, and the theme was “Chemistry is out of this World.” Unfortunately, it was difficult to identify a good forensic-themed activity which was also related to space. Therefore, we came up with an activity for the attending children to create their own bath bombs. All materials used were safe for the kids and we had at least 6 members volunteer in order to watch them. The bath bomb ingredients were put together ahead of time and the kids could pick what colors they wanted to make the bath bomb similar to a galaxy.

On-Campus Events

In recent years, the Forensic Science Club has been attempting to improve our on-campus image and improve campus awareness of our existence. At the two different welcome events and at Regatta, we had a table with a tri-fold board explaining our organization, who the current officers were, and various events we participate in.

Tenth Annual IUPUI 2018 Regatta: We had a small activity for attendees to play where they spun the wheel, read a statement, and answered whether it was true or false. If they missed, they had another chance. If they won, they received an organization cup with a short paragraph.
This past year was an eventful one, and in the upcoming academic year, we hope to continue improving our member retention and campus awareness. In doing so, we hope to participate in more on-campus events.

Involvement Expo during Weeks of Welcome

School of Science Greatest Night in Science

School of Science Welcome Picnic

Murder Mystery Dinner: Our biggest event of the year, the Murder Mystery Dinner, was on April 18, 2019. Our theme this year was Jack the Ripper with an exciting twist naming a woman as the murderer! The turn out was amazing with plenty of attendance and good reception to the dinner this year.

This past year was an eventful one, and in the upcoming academic year, we hope to continue improving our member retention and campus awareness. In doing so, we hope to participate in more on-campus events. This past year has gone well, and we look forward to next year!
During summer 2018, I had the remarkable opportunity to study abroad for a month in Greece with College Year in Athens and learn about the Bronze Age Mediterranean for my classical studies minor. This experience truly changed my life; from the breathtaking views to the vibrant culture and intriguing classwork, I returned to the United States a more knowledgeable, well-rounded, and independent person. On this trip, I spent two weeks in Athens and a week each in Santorini and Crete. Athens was a beautiful blend of remnants of ancient glory and modern city living. The gorgeous island of Santorini showcased a variety of unique beaches, breathtaking sunsets, and the city of Akrotiri buried in volcanic ash many thousands of years ago. Crete hosted many remnants of bronze age civilizations surrounding the vivacious city of Heraklion. Although each new location offered new tastes, smells, and sights, the locals were always very friendly, welcoming, and ready to start up a conversation!

Traveling to a country completely by myself where I knew not a single person was definitely anxiety inducing at first. However, throughout the trip, I learned how to start conversations with strangers, navigate my way around places I had never been to before, and solve my own problems. Moreover, the coursework that I took while abroad far exceeded my expectations and assumptions of lectures in classrooms, worksheets, and exams. Instead, we had a volcanology lesson on top of an active volcano, discussed the technology of bronze age Crete standing on top of a Minoan Palace, and gave presentations about ancient burial rituals inside of the very tombs being examined. Interacting with coursework in such an engaging way inspired me in a way that no other class has before. My passion for ancient history blossomed in such a positive and interactive learning environment. Furthermore, travelling internationally and exploring a culture previously foreign to me broadened my cultural awareness and has solidified my love of travel. I guarantee that I will travel abroad in the future as much as possible!

Overall, I had the most amazing time meeting people, trying new things, and learning, and I cannot wait until I am able to visit this beautiful country again. Studying abroad is an amazing and inspiring experience like no other, and one that I would highly recommend to any student.

Jocelyn Blackburn
Study Abroad: Greece
I traveled to London with the Kelley School of Business on their Brexit, Business, and Brits study abroad trip, which lasted one week and occurred during spring break of the 2017-2018 school year. We had the amazing opportunity to see several historic sites during the trip, including St. Paul’s Cathedral, Tower Bridge, Tower of London, the London Stock Exchange, the U.S. Embassy in London, the Bank of England, Windsor Castle, Stonehenge, Oxford, Westminster Abbey, Palace of Westminster, and many other amazing places. This trip is one of my favorite memories during my time at IUPUI and would recommend going on a study abroad trip to anyone who is able.
This past June I was fortunate enough to be able to study abroad in Wexford, Ireland along with another FIS student, Kali Stevens. The title of the class was Dead Men Do Tell Tales. This class was a hands-on forensic archaeology and Forensic Anthropology course. We had a simulated burial site and had to map the burial site, map and exhume the skeleton, and determine age, sex, and ancestry of real human remains. It was an amazing experience to be able to stay with a homestay family and be immersed into the Irish Culture. We were able to go as almost a field trip to see a local light house and a pub in downtown Wexford. I encourage anyone who feels like they might want to travel abroad to do so because the benefits are so broad.

The students that attended the Dead Men Do Tell Tales seminar in June 2018. Kristina Steward and Kali Stevens both went on this trip.

One of the simulated burial sites.

Kristina Steward
Study Abroad: Wexford, Ireland
Alumni Highlights

Brandy Cline

Indiana State Police

Position: Forensic Scientist—Drug Unit

How long have you been in forensic scientist: 7 years

Family: Parents, sister, nieces and nephews

Interests/Hobbies: Spending time with my nieces and nephews, reading, crossword puzzles, kayaking, and camping.

If I was not a Forensic Scientist I would be: I briefly considered going into pediatric medicine as a college student so I’d probably be a doctor.

Mentors: I’ve been fortunate enough to have many teachers throughout the years that taught me life lessons and values that reach far beyond any classroom.

Something not many people know about me: I’m a pretty good baker. I usually bake a lot of cakes and pies, however, the next desserts on my list to tackle are macarons and crème brulée.
Student Life

Forensic Science and Law Courtroom visit

Faculty and students at the School of Science picnic

Fun in the lab

On campus

Mock Trial
FIS Undergraduate Awards

Maggie Granatir
Siegel Award
Awarded to the top student in FIS 20500 Concepts of Forensic Science I in honor of Jay A. Siegel, Founding Director of the IUPUI Forensic and Investigative Sciences Program.

Paige L. Wallace
Forensic & Investigative Sciences Outstanding Research Award
This award is given to an outstanding student who has demonstrated excellence in research with commitment and desire to advance the field of Forensic Science.

Clarissa M. Hartman
Student Leadership Award
This award is presented to a student who has demonstrated leadership and service in the Forensic and Investigative Sciences (FIS) Program and/or the Forensic Science Club.

Fallon R. Stinson
Academic Achievement Award:
This award is given for outstanding academic achievement, including high GPA and challenging course enrollment.
I have had a great time in this program and really enjoyed my advisor Amy!

I absolutely LOVE the program, and am really, really glad I came here! I will always be grateful for the education I got here!

The program was fantastic for the most part and all Forensic Science professors were fantastic

I have enjoyed all four years with the FIS program and I'm so glad I chose IUPUI to complete my degree. It was the best choice I could have made and I'm glad I'll be around for another two years.

It was a long journey, but a good one at that.

I'm thankful for this program and all the opportunities it has provided!

I really enjoyed my time in the program. The staff is so supportive and helpful. It feels like a little family and it's nice in such a big school like IUPUI

Parting Words of the Graduates
FIS Graduate Students

FIS MS Degrees Granted

Student Profile
Indiana State Police, Spring 2019

I completed an internship with the Indiana State Police Laboratory (biology) division this Spring. One of my main assignments was redesigning the posters used for public tours in the biology section. While my undergraduate degrees had already prepared me with the basics of forensic biology, this opportunity allowed me to see the specific procedures of a crime lab, including the specific instrumentation and updated protocols not always seen in an academic setting. It also gave me practice in independent work followed by presenting my findings, as I was then instructed to present my posters to the analysts and supervisors who would be referencing them throughout their future tours.

As analysts can obviously not bring the public through the lab’s workspaces for danger of contamination, the posters I created are meant to be a visual aid to an analyst’s description of their day to day duties in the lab. Accompanied with pictures and non-technical explanations, these posters are meant to provide a succinct and understandable explanation of forensic science to the general public. Additionally, I was also tasked with summarizing 50 DNA methods manuals for use in reviewing old cases. Often, supervisors and analysts are called to review old cases that contain old DNA methods and terminology. It was my job to review the past 50 manuals of ISP laboratory and summarize the DNA analysis and interpretation methods, combining them into one single document. This way, analysts do not have to dig through a pile of manuals just to determine what "^10" meant in their 2008 PowerPlex protocols. In fact, I made three versions of this document, each subsequent copy more condensed than the next per analyst request. Even so, my shortest copy was over 100 pages long! It just goes to show how much interpretation is necessary on the part of the DNA analyst, and how frequently these methods change in the ISP laboratory.

Doing this internship while also being a full-time student meant that I was always keeping busy. However, I feel my projects gave me a real sense of accomplishment and will leave ISP a quality product from my time with them. I am certainly looking forward to the free time I will gain come the end of my time with ISP, but I don’t regret it in the slightest.

Graduate Student Internship
## Graduate Research

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<th>Project</th>
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<td>Courtney Cruse (PhD)</td>
<td>Dr. John Goodpaster</td>
<td>GC/VUV of Explosives</td>
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<tr>
<td>Zack Roberson (PhD)</td>
<td>Dr. John Goodpaster</td>
<td>GC/VUV of Controlled Substances</td>
</tr>
<tr>
<td>Ashur Rael (PhD)</td>
<td>Dr. John Goodpaster</td>
<td>Packed Capillary GC</td>
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<td>Jackie Ruchti (MS)</td>
<td>Dr. John Goodpaster</td>
<td>Combining chemical analysis with DNA Typing</td>
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<tr>
<td>Kymeri Davis (MS)</td>
<td>Dr. John Goodpaster</td>
<td>Total Vaporization Solid Phase Microextraction (TV SPME) of Controlled Substances</td>
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<tr>
<td>Charity Owings (PhD)</td>
<td>Dr. Christine Picard</td>
<td>Carrion as a Mediators of Blow Fly Population Structure</td>
</tr>
<tr>
<td>Anne Andere (PhD)</td>
<td>Dr. Christine Picard</td>
<td>Sex Chromosome Structure and Function</td>
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<tr>
<td>Ioanna Koltsidou (PhD)</td>
<td>Dr. Christine Picard</td>
<td>Quantitative Genetic Characterization of Antecedent Conditions of Taste and Odor Episodes in Eagle Creek Reservoir</td>
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<tr>
<td>Laura Doll (MS)</td>
<td>Dr. Christine Picard</td>
<td>Population Structure of Insects Dependent on Ephemeral Resources</td>
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<tr>
<td>Brandon Bills (PhD)</td>
<td>Dr. Nicholas Manicke</td>
<td>Development of New Methods for Synthetic Drugs</td>
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<tr>
<td>Greta Ren (PhD)</td>
<td>Dr. Nicholas Manicke</td>
<td>Screening for Synthetic Drugs in Emergency Room Patients</td>
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<tr>
<td>Christine Skaggs (PhD)</td>
<td>Dr. Nicholas Manicke</td>
<td>Development and Validation of Therapeutic Drug Monitoring Methods</td>
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<tr>
<td>Charley Sexton (PhD)</td>
<td>Dr. Nicholas Manicke</td>
<td>Protein and Peptide Detection by Mass Spectrometry</td>
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<tr>
<td>Sarah Dowling (MS)</td>
<td>Dr. Nicholas Manicke</td>
<td>Detection of Chemical Warfare Agents and Drugs in Environmental Samples</td>
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<tr>
<td>Bill Wichert (Post Doc)</td>
<td>Dr. Nicholas Manicke</td>
<td>Detection of Protein Toxins and Drug Residues from Surfaces</td>
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<tr>
<td>Ryan Eller (PhD)</td>
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<td>An Investigation into the Genetic Basis of Visible Human Traits and Their Prediction from DNA</td>
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<tr>
<td>Bailey Wills (MS)</td>
<td>Dr. Susan Walsh</td>
<td>DNA Methylation and Its Impact on Pigmentation Phenotypes</td>
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<tr>
<td>Noah Herrick (PhD)</td>
<td>Dr. Susan Walsh</td>
<td>Skin Tissue Depth and Landmarks of the Human Face for Its Prediction of Ancestry</td>
</tr>
<tr>
<td>Racquel Hopkins (MS)</td>
<td>Dr. Susan Walsh</td>
<td>BMI and Regulatory Genetics Markers</td>
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</table>
Charles (Chuck) Gould Memorial Scholarship: This scholarship is named for Charles (Chuck) Gould, who was an FIS graduate student and an analyst with the Indianapolis Marion County Forensic Services Agency (IMCFSA). Established by his family in his memory, this scholarship is given to the top second-year graduate student in the FIS program.

FIS faculty & advisor with all FIS student award winners and FIS lab graduate student award winners

FIS Graduate Student Awards
FIS Graduate Students Ready to Be Hooded at Graduation

FIS MS Graduates
The Picard Lab has had yet another busy and successful year, and the lab is going to see some major changes coming up. We welcomed a new MS student in Forensic Science (Laura Doll) in the fall, and she’s hard at work on insect population genetics (and will be working on a civil case later on in the summer) – and has at least 1 project completed and nearly ready for publication and already has a poster presentation under her belt!

**Research**

The lab was recently funded by the National Geographic Society for an exploratory grant on the uses of carrion insects to survey vertebrate biodiversity, and we will be heading to the Smokey Mountains and Yellowstone National Park this summer to test our hypotheses. We made a preliminary trip in the summer of 2018 and even discovered a new species of squirrel not previously recorded in Yellowstone, this was accomplished by only sampling flies for 3 days. I was on bear duty while PhD student Charity did the collecting – turns out you need to be especially vigilant when tempting bears with our super smelly fly bait. We are excited to return and expand our sampling scheme. National Geographic Society has also provided some supplementary funds for me to attend and present at the International Congress of Conservation Biology in Kuala Lumpur, Malaysia in July. Serendipitously, while Charity was presenting her research at the Entomological Society of America meeting in Vancouver, BC, a program officer from DARPA became interested in the work we are doing in the environment, and Nick Manicke and I have submitted a proposal to expand upon that work.

The lab continues to increase our genomic footprint, with some additional genomes generated over the last year that include a new species in our repertoire: the yellow mealworm! This work was through a collaborative agreement with an insect production company out of Seattle, and this collaborations continues for the next few years via some DARPA funding. Though not forensically relevant, it is an important species to environmental sustainability and alternative protein production – which leads me to my newest research endeavor: the formation of a new NSF Center on Insects as Food and Feed – we’ll be having our planning meeting in the fall, this is a multi-site Center between IUPUI, Texas A&M University and Mississippi State University – the IUPUI site will be focused on the genetics and genomics of these insects.

**Picard Lab** (left to right):

Kyle Turner (BS 2019), Ioanna Koltsidou (MS 2019), Christina Martin (BS 2020), Charity Owings (PhD 2019), Christine Picard, Anne Andere (PhD 2019), and Laura Doll (MSFS 2020).
Teaching

I was back in full swing starting the fall semester off co-teaching the introductory forensic science survey course to the graduate students (FIS 50500) with Dr. John Goodpaster. I also got back to teaching my graduate forensic biology class (FIS 52100) and this past spring, I was busy teaching the MS students how to find gaps in knowledge and propose research projects that would advance our knowledge. The students have done a great job handling this challenging class.

IUPUI biologist gets National Geographic Society grant to research flies as 'environmental drones'

INDIANAPOLIS -- A single bug could be a messenger for researchers who are studying changing animal populations in a region, according to IUPUI biologist Christine Picard.

Picard is studying how blow flies can be ‘environmental drones’ as they fly around collecting information about animals that have died, animals that are still living and the diversity of animals in an environment. Blow flies collect this data as they feed on remains of vertebrate animals as well as animal feces.

“We argue that this could be a really quick-and-easy way to get an overview of what an environment looks like,” Picard said.

This research caught the attention of the National Geographic Society, which awarded Picard a grant for her project "Environmental Drones: Blow flies as indicators of vertebrate diversity and abundance."

Picard’s previous research allows her lab to identify when the blow flies consume animal fecal matter versus animal tissue and what animal it's from.
News from the Goodpaster Group

Teaching

I taught FIS 51100 (Chemical Analysis of Alcohol and Drugs) in Fall 2018 and FIS 40400 (Forensic Chemistry II) in Spring 2019. These are core classes for our graduate and undergraduate forensic chemistry students, respectively. Both courses have a lab section and I am very grateful to Donna Roskowski for teaching FIS 51101 and Jackie Ruchti for teaching FIS 40401. I coordinated the FIS Seminar in Fall 2018, and we featured speakers such as:

- Tina Beymer and Dana Bors (Indiana State Department of Toxicology)
- George Schiro (Scales Biological Laboratory)
- Myran Tuceryan (IUPUI School of Science)
- Fran Watson (IU School of Law)
- Gregory Smith (Indianapolis Museum of Art)

Research

Research in the Goodpaster Group is currently focused on two techniques: Total Vaporization Solid Phase Microextraction (TV-SPME) and Gas Chromatography / Vacuum Ultraviolet Spectroscopy (GC/VUV). We are currently supported by three grants from the National Institute of Justice to pursue this work:

<table>
<thead>
<tr>
<th>Sponsor</th>
<th>Project Title</th>
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<tr>
<td>National Institute of Justice</td>
<td>Identification Of Low Explosives and Their Post-Blast Residues Via Gas Chromatography (Gc) Coupled with Vacuum Ultraviolet (Vuv) Spectroscopy</td>
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<tr>
<td>National Institute of Justice</td>
<td>Identification Of Drugs In Powders, Liquids, and Plant Material via Total Vaporization Solid Phase Microextraction (Tv-Spmc)</td>
</tr>
<tr>
<td>National Institute of Justice</td>
<td>Coupling Gas Chromatography (GC) and Vacuum Ultraviolet (VUV) Spectroscopy for Forensic Applications</td>
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Perforated Steel Panels forming a "cage" in which IEDs are placed and exploded, thus capturing as many post-blast fragments as possible.
Goodpaster Research Lab

Heather Gordon, GC/VUV of drugs and adulterants

Payton West, GC/VUV of Explosives

Magnus Rydberg – Packed capillary GC
The Analytical Challenges with Fentanyl Analysis - A Roundtable

By VUV Analytics

Editor’s Note: Being unable to attend personally, we requested VUV Analytics to supply a recap of their event in Washington D.C.

On August 8, 2018, VUV Analytics hosted an Executive Roundtable Discussion on the analytical challenges associated with fentanyl analysis. The focus of the Executive Roundtable was the introduction and implementation of new technologies to address the dynamic challenges associated with opioid analysis. Dr. Ira Lurie, a research professor at George Washington University, and Dr. John Goodpaster, professor and head of Forensic Studies at Indiana University – Purdue University Indianapolis (IUPUI) spoke to a crowd of Scientists and Lab Managers from the DEA, United State Postal Inspection Services, NIST, Maryland State Police, and Montgomery County Sheriff’s Department.

Dr. Lurie, detailed advances in both separation and detector technologies to aid in the differentiation of isomeric synthetic cathinones, cannabinoids, and fentanyl analogues. His research on forensic isomer discrimination employs multi-dimensional liquid chromatography with ultraviolet detection, supercritical fluid chromatography (SFC), and gas chromatography with vacuum ultraviolet absorption (VUV) spectroscopy. VUV spectroscopy is a universal gas-phase GC detector technology that offers strong isomer discrimination through unique spectra (120-240nm) for most categories of drugs of abuse including: opiates, fentanyl, cocaine, cannabis, marijuana, cannabinoids, and barbiturates. He presented data showcasing the spectral differentiation of emerging fentanyl species: butonfentanyl and cyclopropyl fentanyl. Dr. Lurie found, in conclusion, that VUV spectroscopy paired with mass spectrometry will maximize the detection capabilities of forensics labs facing the dynamic challenge of synthetic drug ID.

Synthetic drug analysis.

“The VUV Analytics Roundtable discussion was very informative about complimentary technology available to identify positional isomers that have similar mass spectral fragmentation,” says Noel Vadell, a senior scientist with the DEA Northeast Regional Laboratory. “Dr. Lurie and Dr. Goodpaster’s presentations focused on the struggles many forensics labs have confirming fentanyl analogues via traditional GC/MS and GC-FID. VUV detection provides far more analytical data than FID detectors, which survey propanol retention time data. VUV spectroscopy provides structural information complementary to mass spectrometry data for drugs with similar fragmentation patterns and that coelute. Attending seminars like the VUV Analytics Executive Roundtable on fentanyl analysis helps promote technical growth for drug trends in drug chemistry.”

Following presentations by Dr. Lurie and Dr. Goodpaster, a roundtable discussion was held to discuss the challenges associated with analyzing synthetic drug species. Scientists from the DEA, USPIS, Montgomery County Sheriff, Maryland State Police, and NIST identified several issues impacting their ability to effectively and efficiently analyze these compounds, leading to longer backlogs that impact ongoing casework of law enforcement agencies. Attendees agreed that new technologies like vacuum ultraviolet spectroscopy, that reduce reliance on certified reference materials (CRMs) for drug identification, accelerate analysis time and provide real-time confirmation will increase lab efficiency, reduce backlog, and provide greater confidence in results.

As law enforcement agencies struggle to address the growing opioid crisis, the Federal government looks to empower forensic labs to reduce backlog through NIJ grant opportunities. Both Dr. Lurie and Dr. Goodpaster received their funding to study VUV spectroscopy for isomer differentiation through the NIJ and its commitment to solving the opioid crisis.

The Roundtable discussion ended with the conclusion that VUV spectroscopy offers a unique solution to the dynamic and difficult challenges posed by fentanyl analogues and synthetic cathinones and cannabinoids.

VUV Analytics would like to thank Dr. Ira Lurie and Dr. John Goodpaster as well as the attendees from DEA, USPIS, Maryland State Police, Montgomery County Sheriff’s Department and NIST for attending, presenting and participating in the Executive Roundtable on the Analysis of Drugs of Abuse.
The past year was an exciting one in terms of both teaching and research. My research group consists of one FIS masters student (Sarah Dowling), four chemistry PhD students (Brandon Bills, Greta Ren, Christine Skaggs, and Charley Sexton), and one postdoctoral researcher (Bill Wichert). Sarah is on track to graduate this summer. She has been accepted into the chemistry PhD program at IUPUI and has decided to stay on for her doctorate. Brandon Bills is also on track to graduate this summer; he will be the first PhD student to graduate from my group. We’ve had a productive year in the laboratory, and I was pleased to publish several papers, including papers in *Forensic Chemistry* and the *Journal of Analytical Toxicology*. I also taught FIS 40100 Forensic Chemistry I in the fall and FIS 512, Forensic Chemistry II for graduate students, in the spring.

## Research

My research program focuses on bioanalytical and forensic chemistry, with a particular focus on the development of novel mass spectrometry related technologies.

Several students in the group are developing new techniques for forensic and clinical toxicology. In one project, Brandon Bills developed a mass spectrometry method for the detection of fentanyl analogs and synthetic cannabinoids. This work formed the basis for our publication in *Forensic Chemistry*.

In another project, we are working with the medical director of the Indiana Poison Control Center to develop methods to screen for emerging designer drugs such as synthetic cannabinoids and bath salts. This project has been funded by the National Institutes of Health and will also be supported by the IU Grand Challenge: Responding to the Addiction Crisis for the next four years.

We are also collaborating with a Department of Defense laboratory to develop better methods to detect chemical and biological warfare agents. Sarah Dowling has taken the lead on this project. She has developed methods for monitoring chemical warfare agent hydrolysis products, fentanyl analogs, and pharmaceuticals from environmental samples such as soil and water. She gave a podium presentation at AAFS (American Academy of Forensic Sciences) this spring. She has another talk at the ASMS Annual Meeting (American Society for Mass Spectrometry) this summer presenting similar research in a session on homeland security and defense applications of mass spectrometry.

Finally, Bill Wichert published a paper in the Journal of the American Society for Mass Spectrometry on detection of protein toxins from surfaces using wipe sampling. This article will appear in an upcoming focus issue on emerging investigators.

## Service

I served as the chair of the graduate student recruitment committee and as a member of the technical facilities committee for the Department of Chemistry and Chemical Biology.
Teaching

This past year I taught FIS 40100/40101 Forensic Chemistry I in the spring and FIS 51200/51201 Forensic Chemistry II in the spring. FIS 40100 is the first of our two-semester forensic chemistry sequence required for our forensic chemistry undergraduate students. It dealt with the important chemistries and instrumental techniques for analyzing drugs and forensic toxicology. I also taught FIS 51200, which is our graduate level course on instrumental analysis of trace evidence. The course is cross-listed as a graduate course for chemistry students; several graduate students in chemistry enrolled in the course in addition to forensic science majors. I also ran the FIS 51201 lab, which gives our masters students a great chance to work independently on various instruments to analyze trace evidence. Students analyzed gunshot residue using SEM-EDX, performed quantitative analysis of drugs in blood by HPLC-MS/MS, used GC-MS to classify ignitable liquids from fire debris, and analyzed fibers using identification FTIR microscopy.

IU’s Opioid Grand Challenge Moves to Phase Two

BLOOMINGTON - Indiana University has announced 15 new projects for phase two of its Responding to the Addictions Crisis Grand Challenge. The school announced the funding as it marked the one-year anniversary of the $50 million effort.

The phase two projects will cover areas including telehealth recovery, the use of cannabinoids in fighting the epidemic and the public stigma of addiction. Phase one involved 16 projects, many of which, the school says, have already reported results. IU Associate Vice President For Strategic Research Initiatives Faith Kirkham Hawkins says ongoing work includes public forums telling stories of addiction to reduce stigma, surveys to inform policy recommendations and discussions with Indiana’s congressional delegation.

The five-year effort is Indiana University’s third Grand Challenges Initiative. The school is partnering with IU Health, Eskenazi Health and others on the work.

According to Indiana University, second phase projects include:

Telehealth Recovery and Resilience Program -- Opioid Extension 9TRPP-O in Adolescent and Young Adult Trauma Survivors, Zachary Adams, IU School of Medicine.

Noninvasive Deep Neurostimulation Treatment for Addiction, Joshua Brown, IU Bloomington College of Arts and Sciences’ Department of Psychological and Brain Sciences.

Characterizing the Course of Long-Term Opioid Use Disorder Recovery and the Impact of Medication-Assisted Treatment on Opioid Use Disorder Recovery, Melissa Cyders, School of Science at IUPUI.


Accelerating Solutions to the Opioid Epidemic by Repurposing a Cannabinoid CB2 Agonist, Andrea Hohmann, Linda and Jack Gill Center for Biomolecular Science and IU Bloomington College of Arts and Sciences’ Department of Psychological and Brain Sciences.

Vitamin D and Opioid Use: From Real-World Data to Clinical Practice, Xin Li, Richard M. Fairbanks School of Public Health at IUPUI.

Chemical Surveillance System for the Synthetic Drug Crisis, Nicholas Manicke, School of Science at IUPUI.
Rare Form of Amnesia Linked to Fentanyl Overdoses is Spreading

A rare and frightening form of overdose-induced amnesia continues to spread in Massachusetts, with 18 confirmed cases, according to a recently-published New England Journal of Medicine report.

An excerpt from the article

A Potent Drug

Ironically, fentanyl was originally designed in 1960 as a safer form of anaesthesia than morphine. But the same qualities that make it ideal for surgery make it addictive and deadly when used illegally and difficult to detect in blood or urine samples.

The designer, a Belgian chemist named Paul Janssen, tweaked the structure of a molecule similar to morphine so that it could slip quickly past the blood brain barrier, making it extremely fast-acting. He also tinkered with its design to make it bind more tightly to the brain’s opioid receptors, which makes it more potent. In surgeries, doctors usually use far less of the drug, and can induce pain relief within one to two minutes. Its effect is short-lived, generally lasting just a few hours or even less. This fast-in and fast-out mechanism gives anesthesiologists much better control during an operation.

The flip side is that it’s easier for someone to overdose outside the controlled setting of a surgery and harder to detect when they do. “Fentanyl and fentanyl analogs are very potent,” said Nicholas Manicke, a chemist at Indiana University-Purdue University Indianapolis who has helped develop a rapid test for new synthetic cannabinoids and fentanyl and its analogues. “The amount of drug that a person would take is less than they might take with heroin. And that also translates to a smaller concentration in the blood.” Because fentanyl clears the body so quickly, blood samples have to be taken as soon as a patient comes into the hospital.

Manicke’s rapid drug test consists of a small, square, inexpensive cartridge into which a few drops of blood plasma can be loaded. Any drugs in the cartridge are run through a mass spectrometer, which matches the suspect molecule to a database of about 20 synthetic drugs, all within five minutes. The product is still in development, but a screening method like this is orders of magnitude faster than sending blood or urine samples out to a toxicology lab, which is expensive and can take weeks to deliver results.

To find out whether fentanyl is responsible for the syndrome, last May the Massachusetts Department of Health made this new form of amnesia a so-called “Reportable Disease Syndrome,” encouraging clinicians who see patients that fit this pattern to send out for advanced toxicology screens that could detect the presence of fentanyl. That alert resulted in the four new patients from 2017 that are described in yesterday’s report in the New England Journal of Medicine. All four patients’ drug tests were positive for fentanyl, and two of them had no other drugs detectable.

Despite this new evidence, the jury is still out as to whether fentanyl is truly the culprit. It now seems far less likely that a contaminant in the drug is behind the outbreak, but proof that someone developed this syndrome after using pure, pharmaceutical grade fentanyl would help rule that out.

The report’s authors note that one plausible cause of the unique pattern of brain damage is excitotoxicity, a kind of storm in the brain caused by excessive stimulation of neurons. They point to studies that showed severe damage to neurons in the hippocampus of rats who were given fentanyl. It’s likely that insufficient oxygen caused by slowed breathing during an overdose makes matters worse.

The fact that only a tiny percentage of opioid overdose survivors develop this syndrome leads investigators to believe that genetics is also likely to play a role.

As to whether any other drug is responsible, Dr. DeMaria said, “Nothing else has emerged. You have scientific plausibility and consistency. What we don’t have is proof of cause and effect.”
Students & Their Projects

It has been a good year filled with fun and some solid research that I can’t wait to get published. Mirna Ghemrawi, my second FIS MS student completed her studies in the summer of 2018 and is now furthering her education in a PhD program at Florida International University under Dr. Bruce McCord. We have already begun talks on projects that can overlap the two labs. Mirna’s thesis work on the Lebanese population (with collaborators at NIST in Washington DC) has some final ancestry work being performed on it by Noah Herrick, my bioinformatics PhD student (transferred from MS to PhD) and we hope to submit this summer.

Noah Herrick is also working on skeletal thickness measures of the face with CBCT imagery with collaborators in IU Dental school and IUPUI’s computer science department for facial landmarking automation. Noah recently submitted an NIJ fellowship grant that we hope will be funded that will assess landmarks of the face for the inference of ancestry from 3D imagery data. He also presented his work on a preliminary study on Post-Mortem Interval (PMI) estimation from RNAseq data at the American Society of Human Genetics conference in San Diego in 2018.

Stephanie Farmer, My Biology MS student graduated in December after a great defense in which she discussed her work on Y-STRs and Irish surname links with Viking heritage. This work was presented in Poland in 2018 and she also worked quite closely with the Department of Defense (DOD) to uncover the identity of an individual found in a colonial burial site. This was very exciting work to do as it combined genetics with our online investigative skills using genealogical sites. Both research projects are close to completion and we aim to publish the Irish surname project with our Irish collaborators, and the skeletal identity using the Y chromosome project with our DOD collaborators this summer.

Bailey, my third FIS MS student, is due to complete her training in June this year. She has done a great job presenting some of our sequencing research at American Academy of Forensic Scientists (AAFS) in February and has been a wonderful addition to the lab (and as a TA for forensic genetics!). Bailey and Krystal (my previous MS student) are co-first authors on a recently submitted paper to FSI-genetics on the work they did together. Bailey has been instrumental in performing casework for the laboratory, with one cold-case that apprehended a suspect, although our work did not directly aid in identity it was very helpful to the investigators who kept us up to date during the entire investigative process which was extremely interesting for Bailey and I. Bailey’s thesis will also comprise of data from a DNA methylation project and a proteomics project that is ongoing.

Racquel Hopkins began her Biology MS degree in Aug 2018 and is currently researching Body Mass Index through human massive parallel sequencing of a candidate region with the Berbari Lab. Racquel is also interested in human skin color variation and further enhancing the HPS model to represent more non-European skin color variants that we find from our spectrophotometer measures.
Ryan Eller my PhD student is finishing up his PhD this year and therefore is extremely busy writing and completing several large collaborative GWAS analyses on pigmentation and facial morphology. Ryan together with our collaborators at KU Leuven in Belgium, Penn State, Pittsburgh and Stanford University have just completed the largest successful GWAS currently performed on cranio-facial morphology and found over 200 variants. This work is currently being written up by our collaborators with Ryan writing up our portion of the paper on modeling methods. We are hoping for a high impact journal with this exciting work. He also recently presented his work on his Odyssey pipeline at the ASHG. Odyssey was recently accepted to BMC Bioinformatics.

Lastly, our laboratory baby, the genome:phenome database is growing well, with >3500 individuals collected within Indiana and >1500 outside of Indiana (Brazil, Lebanon, Ireland). Due to recent NIJ funding we will continue to expand this resource.

The lab currently has 2 Bio PhD, 2 MS (1 Bio, 1 FIS), 2 undergrads (FIS/BIO) and 1 Freshman. 2 MS (1 Bio, 1 FIS), 1 FIS MS non-thesis and 3 undergrads (2 FIS, 1 BIO) completed this past year.

Overall, I miss all my students when they leave, but it amazes me that even though students leave the lab, they are never really out of reach as we will all still chat on Slack, no matter what part of the country they are in. We still keep each other filled in on our research and career paths which is great.

**Research Collaborations**

The lab is continuing collaborations within IUPUI, with Computer Science (Prof. Shiaofen Fang), and Anthropology (Dr. Jeremy Wilson), including IU school of Dentistry (Prof. Katherine Kula). Noah is taking the lead here with this project collaboration on facial thickness and automated landmarking for which we now have a stand-alone program in beta. We hope to further develop this program and if successful with the fellowship that Noah has submitted, he will try to build an ancestry prediction tool using these landmarks. We have our big collaboration with KU Leuven (Peter Claes), Penn State University (Mark Shriver), University of Pittsburgh (Seth Weinberg) and Stanford University (Joanna Wysocka) that I hope will produce some big publications for Ryan and the lab this year from our multiple projects. We also have a long-standing collaboration with Erasmus MC (Manfred Kayser) that we have been consistently churning through projects with. Our collaborators in QIMR Brisbane Australia (Nick Martin) have completed provisional iris color replication and we have now begun expanding the iris GWAS to have over 6k individuals with digital imagery to really solidify our signals.

Lastly, we are in talks with a commercial company on how to push forensic DNA phenotyping to practitioner laboratories by aiding in the development of commercial products.

**Talks & Publications**

It was a good year for invited talks, and I hope this continues in 2019/2020 as I would like to travel to more conferences to present. I thoroughly enjoyed being Discussion Leader on the Age, Appearance and Ancestry session at the Gordon Research Conference this past summer. It isn’t too often that I must be the one to oversee and manage my former PhD mentor! I also spoke more locally this year, at Indiana University, IUPUI, UIUC, Wabash College and the MAFS conference held here in Indianapolis. Each one of my graduate students (final year MS or PhD any year) presented either a poster or gave a talk this year which is great for their career and exposure for the lab.
The lab was lucky enough to publish 5 articles since this time last year – Nature Ecology & Evolution, Investigative Dermatology, 3 x FSI-G. I hope to double that number this summer as Ryan has a bioinformatics paper accepted with revision, we recently submitted HPS-MPS to FSI-G and are in the midst of writing 3 papers concurrently, so it is a great time of year to get things finished!

**Teaching**

As always, what a super busy spring semester. I finally got to split up the undergraduates and graduates for Population Genetics which is great as I was able to utilize the computational server I recently bought with Biology, to really show the Graduates more hands on bioinformatics. They even got to use their own data, from ancestry.com, 23 and me or if they were involved in my study over the years. It was a very exciting end to the semester when they got to work with whole genome sequence data and really explore various files types using several computational tools. Let’s hope they liked it when I read the class reviews! ;)

**Grants**

I was lucky enough to obtain a new NIJ grant for 3 year’s worth > 650k as PI with my co-PI Mark Shriver. The grant will support our work on understanding and predicting human facial morphology. I am also a subcontractor on a recently submitted DARPA grant with a commercial company that I hope will also be funded as it would secure genotyping funds that will really push research to product.
Clarissa Hartman at IUPUI Research and Engagement Day

Ryan presenting his research at IUPUI Biology Seminar

Biology Department Grads and Profs Baseball Day Out

Halloween Lab Party

The Walsh Lab at Dr. Walsh’s House
New tool predicts eye, hair and skin color from a DNA sample of an unidentified individual

FOR IMMEDIATE RELEASE May 14, 2018

INDIANAPOLIS -- An international team, led by scientists from the School of Science at IUPUI and Erasmus MC University Medical Center Rotterdam in the Netherlands, has developed a novel tool to accurately predict eye, hair and skin color from human biological material -- even a small DNA sample -- left, for example, at a crime scene or obtained from archeological remains.

This all-in-one pigmentation profile tool provides a physical description of the person in a way that has not previously been possible by generating all three pigment traits together using a freely available webtool.

The tool is designed to be used when standard forensic DNA profiling is not helpful because no reference DNA exists against which to compare the evidence sample.

The HiResPlex-S DNA test system is capable of simultaneously predicting eye, hair and skin color phenotypes from DNA. Users, such as law enforcement officials or anthropologists, can enter relevant data using a laboratory DNA analysis tool, and the webtool will predict the pigment profile of the DNA donor.

"We have previously provided law enforcement and anthropologists with DNA tools for eye color and for combined eye and hair color, but skin color has been more difficult," said forensic geneticist Susan Walsh at IUPUI, who co-directed the study. "Importantly, we are directly predicting actual skin color divided into five subtypes -- very pale, pale, intermediate, dark and dark to black -- using DNA markers from the genes that determine an individual's skin coloration. This is not the same as identifying genetic ancestry. You might say it's more similar to specifying a paint color in a hardware store rather than denoting race or ethnicity."

"If anyone asks an eyewitness what they saw, the majority of time they mention hair color and skin color. What we are doing is using genetics to take an objective look at what they saw," Walsh said.

The innovative high-probability and high-accuracy complete pigmentation profile webtool is available online without charge.

The study, "HiResPlex-S system for eye, hair and skin colour prediction from DNA: Introduction and forensic developmental validation," is published in the peer-reviewed journal Forensic Science International: Genetics.

"With our new HiResPlex-S system, for the first time, forensic geneticists and genetic anthropologists are able to simultaneously generate eye, hair and skin color information from a DNA sample, including DNA of the low quality and quantity often found in forensic casework and anthropological studies," said Manfred Kayser of Erasmus MC, co-leader of the study.

Walsh's forensic DNA phenotyping and predictive DNA analysis work was supported by the National Institute of Justice (grant 2014-ON-BX-K031) and IUPUI. She is an assistant professor of biology at IUPUI and a faculty member of the School of Science's highly respected Forensic and Investigative Sciences program.

She is currently working with the Indiana State Police to determine how this tool can help enhance victim identification and crime-solving.
Over the past year I have split my time in half between Forensic and Investigative Sciences and Teaching and Learning Technologies. I continue to teach both introductory courses in forensic science, concepts in forensic science 1 and 2, during the fall and spring semesters as well as online during the summer. I am also the faculty member of two sections of windows on science, a first-year seminar course, during the fall semester with one having a bridge component, a 2-week student experience before classes start in August. I have been participating in service to the university through a community of practice group and a distance education committee as well as serving the forensic science community as program chair of the general section of AAFS.

Teaching Related Accomplishments

I continue to update my teaching in the classroom by exposing my students to current events in forensic science, new technologies available in the classroom, and reviewing my assessment standards for each course.

The second semester concepts in forensic science course, FIS 20600, went through the General Education Core review during the spring semester. This passed the review process and will continue to be a general education core course for all students at IUPUI.

I have reviewed and rewritten the Student Learning Outcomes for all the FIS General Education Core courses. This is related to the campus’s creation of IUPUI+, Profiles of Learning for Undergraduate Success. This replaced the Principles of Undergraduate Learning and Principles of Co-Curricular Learning last spring. I have helped design new FIS Program Level Learning Outcomes (PLOs) and mapped these with the IUPUI+. All of the Student Learning Outcomes (SLOs) from each FIS core course, required of all majors, were then mapped to a FIS Program Level Learning Outcome. This will extend to all FIS course SLOs being mapped to a FIS PLOs and IUPUI+ and then identifying a key assessment from each course that measures each SLO. This will be a great tool which we can use in our accreditation review this fall.

Amy and I continued to teach freshman seminar courses specifically for forensic science majors directly admitted into the FIS program, one with a summer bridge component. This has been a great experience for each cohort, and I continue to see these students on campus together.

I continue to teach online over the summer sessions and have been updating my courses. I plan to go through the Quality Matters process to have both my online courses assessed and certified. I have served as both an external and internal reviewer and plan to complete the Master Reviewer course.

Last spring, I was awarded the Trustees’ Teaching award through the School of Science. I also received the highest achievement, Gold medal, for the Gateway Teaching Academy this fall.

Receiving the Gold Medal Award for Gateway Teaching Academy
In October I applied for FACET, Faculty Academy on Excellence in Teaching, which is a dynamic, collaborative community of distinguished faculty throughout Indiana University. This is a community of faculty from across campuses that address challenges of collegiate teaching developing and sharing strategies to enhance pedagogy and practice. Members are expected to contribute their experience and skills to FACET activities and programs. I was accepted into this elite group of teaching faculty from across the state of Indiana and am 1 of 14 new members in 2019. New members are inducted at the FACET annual retreat in May.

**Service Participation**

This past February I completed my third year as the Program Chair of the General Section of the AAFS. This included reviewing all abstracts for orals, posters, workshops, and breakfasts submitted for the 2019 annual meeting. I built the schedule for the General Section 2-day program of all oral and poster presentations. I plan to continue my involvement with the General Section of AAFS. I have been appointed the Chair of the Disciplines Committee for the section and will serve on my first Academy wide committee on the digitalization of meeting workshops and presentations. I completed my three-year term as the treasurer for the Council of Forensic Science Educators (COFSE), which I have served since 2012, and we elected President-Elect at our meeting in February.

I have continued to serve as the chair of the IFC Distance Education Committee and Community of Practice on Academic Integrity and participate in outreach through our community. I have participated in multiple science nights at local elementary schools (see the Community section).

I have also been asked to speak in the community both for Science on Tap and for the Forensic Series as the Indiana Medical History Museum. Both talks focused on Forensic Trace evidence and the myths behind the role of hairs and fibers in case work.
New Position with Teaching and Learning Technologies

I have worked on three major projects during this past year while with the Teaching and Learning Technologies Team.

I have continued to work on the Academic Integrity Canvas Sites for both undergraduate students and faculty and teaching assistants. The student site has been available since November 2017 and currently has over 4000 enrolled students. The faculty and teaching assistant site will hopefully be completed by the end of the academic year and will be incorporated into the new faculty orientation process. During this project, I have led the design on multiple non-credit Canvas sites focused on academic integrity (UG student-facing and faculty/teaching assistant-facing). I lead a team of 5 faculty, 3 staff from the Center for Teaching and Learning, and various instructional designers to develop, refine, and maintain standalone Canvas sites. I have also presented our work at multiple conferences and published the work that we have done.

During this past year I have also been developing an IU Online Webinar Series – Continuing the Conversation. This was started following the IU Online conference with various faculty from multiple IU campuses. I was able to find IU online teaching faculty and learn about the tools and techniques used in online courses. These webinar and resources were created resources in through ProfessorPedia. This semester I recorded 4 webinars with faculty from IU Kokomo, IU South Bend, IU Bloomington, and IUPUI.

One of the biggest projects that I have taken on is to develop an online laboratory course. Non-science majors are many times required to complete a laboratory experience, having an option for distance learners is a needed resource for the growing online student population. I have led a team to start the initial design of an online laboratory course to be able to submit a proposal through the Center for Teaching and Learning. I received a grant through the CTL to develop this course and the funds will be used to hire a student worker, purchase kits for a pilot of the course, and to present work at an online teaching conference. I have helped plan virtual field trips for a forensic science laboratory and online geology laboratory course. I have also worked with different hands-on laboratory companies that produce kits designed for online learners. I plan to continue the creation of this course, Investigating Forensic Science, throughout this year and hope to offer a pilot of the course in Spring 2020.
From the Desk of Donna Roskowski

This year has been eventful! I have given many tours, successfully passed a General Education Credit audit of my lecture course, taught my first classes on-line, and made some serious adaptations to my courses to accommodate a visually impaired student.

I have been with FIS for three and a half years now. There is still a bit of a learning curve for me, and I seem to have a never-ending supply of new and interesting challenges every semester.

Teaching

FIS10100 and FIS10100 Investigating Forensic Science

Both classes are taught during Fall, Spring and now Summer semesters. During the Summer and Fall of 2018, I taught an on-line section of FIS10100. This worked really well and I am fairly pleased that things are running smoothly! I hope to continue offering this course on-line during Summer I and Fall semesters. I continue to add and make some improvements to the way I run this course. The changes I have made seem to be working well. I am in the process of administering exams through the class Canvas site and using the testing center, rather than giving exams on paper or on scantron forms. This should allow for a faster grading and reporting process. Utilizing the testing center for final exam will allow students the flexibility of scheduling their exams during finals week.

The FIS10101 laboratory class continues to be very popular. When I started at IUPUI in the fall of 2015, the class was running two or three sections. I am now running seven and will possibly run eight in Fall of 2019. This class is taught in Spring, Summer and Fall semesters. I have two undergraduate Teacher’s Assistants, Clarissa Hartman and Emily Baker, and three graduate student TA’s, Laura Doll, Samantha Guinn, and Bobbi McGlone. My goal for this year, and for the years ahead, is to utilize Work Study eligible students as Teacher’s Assistants. This saves our program a great deal of money and helps our students!

During the Spring semester, I had a visually impaired student in both FIS10100 and FIS10101. Since I had this situation before in the lab, I was prepared and had the course adaptations completed. However, converting the lecture course proved to be much more complicated that it should have been and support from the University was slow, if present at all. I made a completely new course site just for this student, with
adaptations of my in-class assignments in a format that can be ready by this student and his laptop! It is an on-going project, as we are always making adjustments to figure out what works, and what doesn’t. I’m happy to report that it is working very well. As part of the adaptations, I bought voice recognition software and a headset with a microphone (at my own expense) to transcribe some of the reading material. This worked really well and I’m quite good at it! I apparently impressed the AES (Adaptive Education Service) people because they offered me a job, which I declined. I was able to hire one of our FIS students, Jessica Harris, as an aide for this student to help him in class. She has done a fabulous job and I am hiring her as a Teacher’s Assistant next year!

![Student Ryne Robinson and FIS Student/Aide Jessica Harris](image)

**FIS 51101 Forensic Chemistry**

I taught the FIS51101 Forensic Chemistry lab for the third time during in 2018. It was a class of three students. This class covers some toxicology, statistics and drug analysis. I’ve based many of the labs on the same training materials I used during my training and tenure at the Indiana State Police Laboratory. I’ve added a Ultra-Violet Spectrophotometry lab, which made the schedule a bit tight and added a couple of demonstrations that the student really liked, as these were timely in that it seemed to coincide nicely with Dr. Goodpaster’s lectures and enhance the students understanding of the material. I really enjoy this small class and interaction with the students. The schedule is still a bit tight, so I will continue to make adjustments. All of the students are doing well, but they are really working for it!

**FIS 49600 Independent Study**

Graduate students are starting to ask about Independent study with me. I had one student in the spring of 2016, have my second in the spring of 2019 and I anticipate one more in the summer of 2019. This is a great opportunity for students and for me as well. Currently, I have my student working on a Headspace Gas Chromatograph instrument manual and revising my blood alcohol lab exercise for FIS51101. She is also creating user drug libraries on the FTIR and GC/MS in the Teaching lab (EL135). Most of semester has been frustrating due to an alignment issue on the headspace unit, so we are both learning how to fix that! My next student will pick up where we leave off on these projects; create a drug user library on the RAMAN instrument; and other instrument maintenance and repairs.
**Campus Involvement**

As part of my job, I am the Safety Officer and sit on the Campus Chemical Hygiene Committee. I am proud to report that the FIS Program laboratories continue to receive glowing inspection reports! It shows that we continue to follow the rules, and are vigilant in our laboratory operations.

I continue to function as the program purchaser, as well as keep track of the lab drug, supply and chemical inventories. This was another expensive year for us in that our enrollments were up again, and we needed a lot of supplies and small equipment for our increasing numbers of students with the same operating budget that we have had for at least three years.

Last year, I assumed responsibility for programming the proximity cards for the FIS SELB laboratory locks. This year, I have learned to hire and process the FIS TA’s, so I will be doing that from now on. I also have been tasked with the search for a replacement for the Chemistry Department Instrument Engineer position. That position is much like my own, except that position does not have teaching responsibilities. In the meantime, I am on deck to cover some of the duties of that position as needed.

I am completing my third year as a faculty mentor/advisor for the Alpha Phi Omega Tau Omicron (APO-TO) Fraternity. Alpha Phi Omega is a co-ed service fraternity that was formed based on principles of the Boy Scouts of America. They are a fun and energetic group. As of this year, I am the Advisory Chair for this group, helping them through their struggles to grow and maintain membership. I look forward to working with them on and off campus.
A Year to Reflect and Refine—Amy Maudi

I set some goals this year, and they were ambitious. It has been a wonderful journey of reflection and refinement.

Coaching

I participated in three coach training programs this year. My desire was to refine my skills and add more tools to my student support toolbox. There were students who I knew could do well, but were not able to reach their potential. I had tried many approaches, but none really helped until I started taking coaching workshops. I am now certified in two different approaches to coaching and became a coach trainer. Soon I will begin studying for the national board certification exam. As part of this journey, I took on a group of students to coach the whole year. The students set the agenda in these meetings to explore the areas they wanted to go from good to great. It was a powerful way to connect and refine my skills as an academic advisor. I was amazed at how effective it was. Here is a quote from one of my coachees:

Amy then took on the role as a life coach for me to help me reach my best. As my life coach, she took even more time throughout the summer to figure out what was still keeping me down and helping to make sure I was on track to complete school. She started out by asking about my personal goals in life were. Here I got to discuss my gym effort in becoming a marathon runner and the overall goal of completing school so I could focus on my future career. Our first meeting we set up tasks that would help me maintain my personal goals that could be translated into academic skills. The first goal was to keep on task of going to the gym which would translate keeping up with homework. Ever since then, I've been getting steps closer to my personal goals, as I ran a half marathon to start and my academics have also been doing as well as when I first started as a freshman.

Teaching

Capstone: I continue to teach the senior capstone class. I had the joy of co-teaching this year with two amazing PhD students, Charity Owings and Zachary Roberson who mentored the students on scientific research and poster presentation. I was Zachary’s advisor starting from his first year, so it was gratifying to see how much he has grown into a mentor for others. He is pictured at the capstone poster session. Some feedback:

I loved this class! It was very helpful to me!

Amy is great! Always provides feedback and is incredibly helpful as an instructor and advisor.

Although this class made me do stuff that made me go outside my comfort zone which sucked at the time I do believe it was helpful and I am glad we had to do it!
**Freshmen Seminar and Bridge:** We have continued the experiment we began in 2016 of having an FIS freshmen seminar. This year we once again had all FIS freshmen. Prof. Londino-Smolar and I co-teach an extended seminar which starts two weeks before classes begin and a standard class. We combine the classes to ensure the students all meet and do projects together. As an advisor, I can see the multitude of ways this is impacting the students’ sense of belonging by creating friendships, study groups, and roommates.
Professional Development, Awards, and Promotion: I was honored to be selected IUPUI Academic Advisor of the Year. This was such a privilege as my fellow science advisor, Jane Alexander nominated me. As the winner I was the nominee for IUPUI to the NACADA national award. After a 67 page application, I am thrilled to share I won the NACADA Certificate of Merit. I will be going to the national conference in October to receive this award. I have also been awarded a Staff Council Professional Development Grant to help pay for the conference.

One of my goals this year was to take on the enormous task of going up for promotion to senior academic advisor. In the three years this process has been in place, only four people have been promoted. I am pleased to say I am one of the four.

I was part of a group of four advisors and two advising administrators who were awarded a Welcoming Campus Initiative Grant to explore the issue of how to better create a sense of belonging in students admitted to University College. Through the grant we held an institute where nearly every school on campus attended to have focused work time on how they could better welcome students who are not initially admitted to their school. Since the institute, we have accepted applications and awarded seed money to schools to operationalize their plans. We were chosen to present a poster about our work at the Welcoming Campus Conference and will be presenting on the process of being an agent of change in education at the All-IU EDGE Conference as well as at the national NACADA conference in October.

It has been a year to truly reflect on the work I love. Writing a 116-page dossier for promotion gave me a lot of time to consider how I would like to improve and grow. I love the process of improvement, so I am excited to see how much better we can make the experience of every FIS student.

FIS graduates and I at the School of Science Ignite event at the Indiana State Museum
Amy Maidu receives senior academic advisor distinction

Apr 16 2019

Maidu is the first School of Science advisor to receive this distinction

By Candace Beatty Gwathney

As a constant advocate and supporter for forensic science students, Amy Maidu is a force for student success within the School of Science. In recognition of her achievements and dedication, Maidu has been promoted to senior academic advisor. Maidu has served as an academic advisor for the Forensic and Investigative Science program since 2012.

This position was awarded to her after review by the IUPUI Academic Advisor Development Program (AADP), a program devoted to maintaining and improving academic advising standards through education, training and commitment to students.

Maidu shared her driving purpose and philosophy behind her advising work: ‘Advising causes students to stretch; once stretched, the student should be able to go a little further, recover a little faster, and see a bit more of the wonder and strength within themselves.’

Maidu’s success is evident in student outcomes. She creates four-year plans for every student she advises—and she advises more than 200 students each year. In the 2017-2018 academic year, her students are also graduating with impressive credentials with 83% graduating with a double major and 96% with a double major or minor. In the same year, Maidu’s first-time, full-time graduates also complete their degrees in four years at a 75% rate, and 100% complete their degrees within five years.


**Funding**

**Dr. Christine Picard**


**Prof. Gina Londino-Smolar**

School of Science Graduate Technology Funds. Acquisition of Cameras for Student Microscopes, PI: Gina Londino-Smolar, $40,000. (2019)

**Dr. Susan Walsh**


**Dr. John Goodpaster**


Dr. Nick Manicke


Publications

Sardar, R; Liyanage, T; Rael, A; Shaffer, S; Zaidi, S; Goodpaster, J.V. Fabrication of a self-assembled and flexible nanosensor for explosive detection at parts-per-quadrillion levels from fingerprints. Analyst 2018; 143(9), 2012-2022.


Fuenffinger, N., Goodpaster, J.V., Bartick, E., Morgan, S. Classification Strategies for Fusing UV/visible Absorbance and Fluorescence Microspectrophotometry Spectra from Textile Fibers. Microscopy and Microanalysis, 2018; 24(S1), 1168-1169.


**Presentations**

Underlined indicates student presenter

**Dr. John Goodpaster**

**JV Goodpaster.** “Derivatization and Identification of Controlled Substances via Total Vaporization Solid Phase Microextraction (TV-SPME) and Gas Chromatography/Mass Spectrometry,” The Pittsburgh Conference, Philadelphia, PA, March 2019

**JV Goodpaster.** “Identification of Nitrate Ester Explosives and Their Thermal Decomposition Products by Gas Chromatography/Vacuum Ultraviolet Spectroscopy (GC/VUV),” The Pittsburgh Conference, Philadelphia, PA, March 2019

**JV Goodpaster.** “Identification of Explosives and Their Post-blast Residues via Gas Chromatography Coupled with Vacuum Ultraviolet Spectroscopy,” Michigan State University, East Lansing, MI, February 2019

**JV Goodpaster.** “Coupling Gas Chromatography (GC) and Vacuum Ultraviolet (VUV) Spectroscopy for Forensic Applications,” Forensic Technology Center of Excellence, NIJ Webinar, April 2019

**JV Goodpaster.** “Species and Age Determination of Blow Fly Pupae Based upon Headspace Analysis, headspace analysis,” Forensic Technology Center of Excellence, NIJ Webinar, October 2018

**A Rael, M Rydberg, JV Goodpaster.** “Towards low activity silica gas-solid 20 micrometer micropacked capillary gas chromatography,” Indiana University-Purdue University Student Research Day, Indianapolis, IN, April 12, 2019

**K Davis, JV Goodpaster.** “An Overview of Total Vaporization – Solid Phase Microextraction and its Forensic Applications,” American Chemical Society: Think Like a Molecule Symposium, Indianapolis, IN April 5, 2019


**K Davis, JV Goodpaster.** “Detection of Various Drugs in Human Urine Samples Via Total Vaporization – Solid Phase Microextraction,” American Academy of Forensic Sciences Annual Scientific Meeting, Baltimore, MD, February 20, 2019

**K Davis, JV Goodpaster.** “Methods and Applications for Total Vaporization – Solid Phase Microextraction (TV-SPME),” Midwestern Universities Analytical Chemistry Conference, East Lansing, MI, November 16, 2018

**K Davis, JV Goodpaster.** “Detection of Drugs in Various Matrices Via Total Vaporization – Solid Phase Microextraction”, Midwestern Association of Forensic Scientists, Indianapolis, IN, September 19, 2018

**K Davis, JV Goodpaster.** “Detection and Monitoring of Compounds used in Drug Facilitated Sexual Assaults,” IUPUI Graduate Student Multidisciplinary Symposium, Indianapolis, IN, July 20, 2018

**Dr. Christine Picard**


**WP Gilhooly III, J Harris, A Bosco-Santos, BA Steinman, E Crane, CJ Picard, M O’Beirne, J Werne.** “The chemical and biological evolution of a meromictic lake, Washington, USA,” Goldschmidt Conference, Boston, MA, August 12-17, 2018
CJ Picard. “Forensic entomology in the genomics era: how little we know with so much data,” IUPUI Forensic and Investigative Sciences Seminar Series, Indianapolis, IN, August 27, 2018

CJ Picard. “Forensic entomology in the genomics era: how little we know with so much data,” Valparaiso University Seminar Series, Valparaiso, IN, September 10, 2018

I Koltsidou, C Howard, CJ Picard, G Druschel. “Midwest Geobiology 2018 Conference,” Northwestern University, Evanston, IL, October 6, 2018

CG Owings, CJ Picard. Graduate Student Showcase, Entomological Society of America Annual Meeting, Vancouver, British Columbia, Canada, November 11-14, 2018


Prof. Gina Londino-Smolar

GM Londino, DL Sturek. "Establishing a Culture of Academic Integrity at an Urban Univeristy," International Center of Academic Integrity Conference, International Center of Academic Integrity, New Orleans, March 9, 2019

GM Londino, C Hansel, J Sanders. "Creating a digital learning community to cultivate academic integrity," Online Learning Consortium, Orlando, FL, November 15, 2018

GM Londino, K Wendeln. "Creating a Culture of Change for Academic at IUPUI," FALCON, FACET and Indiana University, Indianapolis, IN, November 10, 2018

GM Londino, C Hansel, C Yildirim. "Creating a digital learning community to cultivate academic integrity," IU Online Conference, Indianapolis, IN, November 9, 2018

GM Londino. "The Truth about Trace Evidence," , Indiana Medical History Museum, Indianapolis, IN, April 3, 2019

GM Londino. "Every Contact Leaves a Trace," Science on Tap, School of Science, Indianapolis, IN, January 17, 2019

GM Londino. "IU Online Pre-Conference Workshop," IU Online Conference, IUPUI, Indianapolis, IN, November 8, 2018
**Dr. Susan Walsh**

N Herrick, **Susan Walsh**. “The Search For Quantitative Iris Pigmentation Markers Using Automation in Genome-Wide Association Studies: From Phenotype to Genotype,” American Society of Human Genetics (ASHG), San Diego, CA, 10/18/2018

R Eller, **Susan Walsh**. “Tissue Transcriptomics: Potential for Postmortem Interval Predictions, American Society of Human Genetics (ASHG),” San Diego, CA, 10/18/2018

**Susan Walsh**. “The Prediction of Human Physical Appearance from DNA,” Department of Biology, Wabash College, IN, 3/19/2019

**Susan Walsh**. “The Modeling of Human Physical Appearance Prediction from DNA,” IU School of Informatics, Bloomington, IN, 11/18/2019

**Susan Walsh**. “Research Overview Presentation on Human Physical Appearance Prediction from DNA,” IUPUI School of Science, Indianapolis, IN, 11/18/2019

**Susan Walsh**. “Human Physical Appearance Prediction from DNA,” Department of Anthropology, University of Chicago-Urbana Champaign, IL, 11/18/2019

**Susan Walsh**. “Discussion Leader: Age, Appearance and Ancestry,” Gordon Research Conference, Sunday River, Maine, 9/18/2019

All Walsh lab. “Phenotyping Workshop,” MAFS Conference, Indianapolis, IN, 11/18/2019

**Dr. Nicholas Manicke**

**N Manicke**. "New Mass Spectrometry Approaches for Applications in Clinical Chemistry, Defense, and Forensics," Annual Meeting of the Norwegian Society for Mass Spectrometry, Hafjell, Norway, 2019

C Skaggs, **N Manicke**. "Chemical Assay for the Detection of Vertebrae Fecal Metabolites in Adult Blow Flies (Diptera: Calliphoridae)," ACS Spring National Meeting, New Orleans, LA, 2018

S Dowling, **N Manicke**. "Detection of Fentanyl and Its Analogs in Soil via Paper Spray Mass Spectrometry," 2018 Turkey Run Analytical Conference, Marshall, IN, 2018

**N Manicke**. "Development of Mass Spectrometry Cartridge for Sensitive Detection of Target Protein Using On-Cartridge Digestion,” 2018 ASMS Annual Conference on Mass Spectrometry, San Diego, CA, 2018

C Skaggs, **N Manicke**. "LC-MS/MS Detects Urobilinoids from Feces in Fly Guts," 2018 ASMS Annual Conference on Mass Spectrometry, San Diego, CA, 2018

**N Manicke**. "New Mass Spectrometry Approaches for Applications in Clinical Chemistry, Defense, and Forensics," Departmental Seminar - Georgia Tech, Georgia Tech, Chemistry Department, Atlanta, GA, 2018

**N Manicke**. "New Mass Spectrometry Approaches for Applications in Clinical Chemistry, Defense, and Forensics,” Departmental Seminar - Maryland, University of Maryland - College Park Department of Chemistry, College Park, MD, 2018


G Ren, N Manicke. "Rapid Screening of New Synthetic Drugs in Plasma Samples Using Paper Spray Mass Spectrometry with Integrated Solid-Phase Extraction Cartridge,” 2018 Turkey Run Analytical Conference, Marshall, IN, 2018


Amy Maldi

A Maldi, C Zapata, L Vernon, M Patel, M Rust, M Kinney. “Be the Good: Crafting Time to Share and Value One Another to Create Change,” IUPUI Welcoming Campus Conference, Indianapolis, IN, April 16, 2019

A Maldi. “Coaching Conversations at IU—Certification Process,” IUPUI JACADA Professional Development Day, Indianapolis, IN, May 2, 2019

A Maldi, C Zapata, L Vernon, M Patel, M Kinney. “Be the Good: Agents of Change in Education,” All-IU EDGE Conference, Indianapolis, IN, May 22, 2019
Community Service

Forest Dale Elementary Science Night

Prof. Gina Londino-Smolar organized FIS students to introduce forensic science to elementary children. Dr. Christine Picard presented maggot art.

Strawberry DNA

Cabbage Chromatography and Volcano

Maggot Art

Fingerprints
JACADA NAMES ADVISORS OF THE YEAR

JACADA ran its annual Advisor of the Year (AoY) campaign this past fall, continuing the Academic Advising Administrator of the Year, Faculty Advisor of the Year, and Academic Advisor of the Year (Primary Role) and adding an Outstanding New Academic Advisor award as well. We reoriented the AoY schedule to better align JACADA’s award season with NACADA’s, as all of our recipients are encouraged to submit their names for the national-level awards.

This year’s recipients were Laura Masterson (SHHS) for Academic Advising Administrator of the Year; Mike Politis (Department of Communication) for Faculty Advisor of the Year; Amy Maidi (Department of Forensic and Investigative Sciences) for Academic Advisor of the Year (Primary Role); and Ashley Maliknya (Department of Health Sciences) for Outstanding New Academic Advisor. The runners-up were James Eckert (SPEA) for Administrator; Kara Woodlee (Honors) for Advisor; and Lygia Vernon (Liberal Arts) for New Advisor. Congratulations to all!

When we advance and support our advising—whether it be through their own passions and interest or through an approved advancement process on campus—we support the success of our students.

Outstanding Advising Award - Primary Advising Role - Certificate of Merit Recipients

Amy Maidi
Indiana University - Purdue University
Indianapolis

RESEARCH AWARD FOR TENURE-TRACK FACULTY

This award is in recognition of outstanding contributions in the area of research by a tenure-track faculty member.

Nicholas E. Manicke
Chemistry
Below is a sampling of places our undergraduate students have gotten employment:

- Advanced Testing Laboratories
- Agilent Technologies
- AIT Laboratories
- AIT Bioscience
- Anheuser Busch Brewery (Missouri)
- Arkansas State Police
- AstraZeneca
- Axis Forensic Toxicology
- Belize National Forensic Science Service (Belize)
- Bismarck Crime Laboratory (North Dakota)
- BioStorage Technologies, Inc.
- Bode Cellmark Forensics (Virginia)
- Brooks Life Sciences
- Buchi Laboratory Equipment (North Carolina)
- Carrollton Police Department (Kentucky)
- City of Columbus Division of Police (Ohio)
- Clarksville Community School Corporation (Kentucky)
- Colorcon
- Community Healthcare Systems
- Covance Laboratories
- Deaconess Health System
- Drug Enforcement Administration (DEA, Maryland)
- Dupage County Forensic Science Center (Illinois)
- Eli Lilly and Company
- Federal Bureau of Investigation (FBI, DC)
- Florida Department of Law Enforcement (Florida)
- Fort Wayne Police Department
- Heritage Crystal Clean
- Indian River Crime Lab (Florida)
- Indiana Blood Center
- Indiana State Department of Toxicology
- Indiana State Police Forensic Laboratory
- Indianapolis-Marion County Forensic Services
- Agency
- Intertek PSI
- Inworks (Colorado)
- IU Simon Cancer Center
- IU School of Medicine
- Lancaster Laboratories
- Lonza (Maryland)
- Marion County Coroner's Office
- Medical & Molecular Genetic (MMGE)
- Miami Valley Regional Crime Laboratory (Ohio)
- Mid America Clinical Laboratories
- MiraVista Diagnostics
- Pepsico
- Perry Township Schools
- Polaris Laboratories
- Quintiles Laboratories
- Raabe Company (Wisconsin)
- Raybourn Group International
- Roche Diagnostics
- Sacramento County District Attorney’s Office (California)
- Southern Illinois University Edwardsville
- St. Charles County Sheriff’s Department (Missouri)
- St. Vincent Health
- Strand Analytical Laboratories
- Texas Department of Public Safety (Texas)
- Thermo Fisher Scientific
- United States Drug Testing Laboratory (Illinois)
- United Water
- University of Miami Miller School of Medicine (Florida)
- Van Nuys Medical Science Center
Below is a sampling of places our undergraduate students have or are attending graduate school.

- Cornell University: Physician’s Assistant School
- Drexel University: Physician’s Assistant School
- George Washington University
- Johns Hopkins
- Indiana University Medical School
- Indiana University Law School
- Indiana University Higher Education and Student Affairs Program
- IUPUI: MS in Forensic Science
- IUPUI: PhD in Chemistry
- Marion University School of Osteopathy
- Michigan State University
- University of Colorado Denver: PhD in Biology
- University of Indianapolis: STEM Teaching Program
- University of Illinois College of Law
- University of Florida
- University of Tennessee: PhD in Chemistry
- Virginia Commonwealth University

Below is a sampling of places our graduate students have gotten employment.

- Allegheny County (Pennsylvania)
- Aria Diagnostics
- Bexar County Criminal Investigation Laboratory
- Butler University
- Colorado Bureau of Investigation
- Covance
- Denver State Police
- Dow AgroSciences
- Eli Lilly and Company
- Garden of Life (Florida)
- Henry Ford Health Systems
- Ideal Innovations, Inc. (Afghanistan)
- Indiana State Department of Health
- Indiana State Police Forensic Laboratory
- Indiana State Department of Toxicology
- Microbac Laboratory Services
- Nebraska State Patrol
- Ocean Optics (Florida)
- Rhode Island Department of Health
- South Texas College of Law
- State of Colorado Biology Laboratory
- Sun King Brewery
- Texas Department of Public Safety