Welcome to the newest edition of the IUSD Student Research Group newsletter!

By Alli Scully, D4

Thank you and welcome to IUSD’s Student Research Group (SRG) newsletter! While the SRG has been a student organization for many years, our newsletter is very new – Stuart Ryan created the first publication last year. His inaugural issue won first place in the national newsletter competition hosted by the American Association for Dental Research (AADR). The SRG meets every other Tuesday evening in our Student Research Presentation Program (SRPP) where different students present their research. This is a time to learn about ongoing research at the school while also allowing presenters to get valuable feedback on their projects. There are many different levels of research from undergraduate, professional, and graduate students who present their work at SRPP. There is such variety in research at IUSD that anybody can find a subject that they are interested in, whether they are a seasoned researcher or have no research experience at all. I invite you to browse through the articles in this issue to learn more about the award winning research that is being conducted at IUSD. Research can open many opportunities to travel and meet other students and researchers from dental schools across the country. Each year many of our students attend AADR to present their research posters and even oral presentations. IUSD students also regularly attend the Hinman Student Research Symposium, the ADA/Dentsply Student Clinician Research Program Competition, and the ADA Foundation Dental Student Conference on Research. If you are interested in research, I highly suggest attending SRPP meetings every other Tuesday evening or contacting a faculty member that is working in an area that interests you. Please enjoy our latest newsletter that D2 Philip Hoyt has helped publish and feel free to contact me (scullya@iupui.edu) or our faculty sponsor Dr. Gregory (rgregory@iu.edu) if you have any questions.

-Alli Scully
IUSD Class of 2015
SRG President

IUSD Student Research Day 2014
A huge hit! Take a look at the award winners from this year’s Research Day and their projects.

Page 2-3

IUSD Travels to Saudi Arabia
Indiana University signed a new research partnership with a premier university in the Middle East, King Saud University.

Page 6

IUSD Research Faculty Spotlight
Check out this interview with IUSD Professor of Oral Biology Dr. L. Jack Windsor and see how he got involved with a career in science and research.

Page 8
Research Day 2014

by Stuart Ryan, D3

Research Day at the Indiana University School of Dentistry has been a rich tradition for over 20 years. The event gives students from all departments the opportunity to showcase their research efforts and learn more about various topics on the forefront of dental research. This year, we featured the work of 78 students from IUSD as well as invited participants from the University of Detroit Mercy School of Dentistry and the University of Louisville School of Dentistry. The keynote speaker for the event was Dr. Peter Polverini, professor and dean emeritus from the University of Michigan School of Dentistry. He gave an informative and entertaining presentation entitled, “Personalized Oral Health Care: Is Dentistry Prepared for a Prospective Healthcare Environment?”

Following the keynote address, students, faculty, and staff were honored for their hard work and research contributions with the award ceremony. Dr. Theresa Gonzalez from the department of operative dentistry was awarded the Distinguished Faculty Award for Teaching. Dr. Marco Bottino, assistant professor of dental biomaterials, was awarded the Distinguished Faculty Award for Research. The IU Trustees Teaching Awards, which recognize outstanding dedication to education throughout the university, were awarded to five IUSD faculty members: Dr. Richard Gregory, oral biology, Dr. Stuart Schrader, oral biology, Dr. Laura Romito, oral biology, Dr. Kelton Stewart, orthodontics and oral facial genetics, and Ms. Sheri Alderson, dental assisting.

The pre-doctoral awards provided much enjoyment for the audience, which was largely comprised of DDS, hygiene, and dental assisting students. Austin Starr, under the mentorship of Dr. Marco Bottino, won a number of awards for his cutting-edge project in the field of regenerative periodontics entitled, “Metronidazole-Containing Delivery Systems – Effect on the Oxidative Burst of Human Neutrophils.” Starr received the Procter & Gamble Award for Excellence in Preventive Oral Health Care, the Indiana Section of the AADR Interschool Dental Student Research Award, the ASDA Student Research Group Award, and the Cyril S. Carr Research Scholarship.

The American Dental Association/Dentsply International Student Clinician Award was presented to Allison Scully, mentored by Dr. Joan Kowolik, for her project entitled “Chart Review of Treatment of Retained Primary Mandibular Molar Teeth."

The Indiana Section of the American Association for Dental Research Staff Award was presented to Ms. Marilyn Richards, executive assistant at the Oral Health Research Institute in the department of preventive and community dentistry.

[Continued on page 3]
IUPUI freshman Phillip Witcher was awarded the Johnson & Johnson Undergraduate Student Award for his project with Drs. Richard Gregory and L. Jack Windsor entitled, “The Effect of Fulvic Acid on Streptococcus mutans and SCC-25 Cells.” The Elizabeth A. Hughes Dental Hygiene Case Report Award was presented to Ms. Jessica Janoski and Ms. Kristin Lamping for their project “Modification of Dental Hygiene Care Plan for a Dementia Patient.”

Wen Lien, a master’s student in the dental biomaterials program mentored by Dr. Gabriel Chu, was awarded the Delta Dental Award for Innovation in Oral Care Research for the project “Optimization of Crystalline Kinetics, Thermal Processing, and Strength of a Dental Lithium Disilicate Glass-ceramic.”

The Indiana Dental Association Best Clinical Case Report Award was presented to Dr. Himabindu Dukka, a master’s student in periodontics mentored by Dr. Steven Blanchard, for her clinical case presentation entitled, “Effects of Platelet Rich Fibrin Matrix on Bone Regeneration and Soft Tissue Healing in Combination with Freeze-Dried Bone Allograft in Ridge Augmentation: A Case Report.”

The Maynard K. Hine Award for Excellence in Dental Research for Best Research Manuscript was awarded to Alaa Sabrah (mentored by Drs. Ghaeth Yassen and Richard Gregory) for the manuscript “Effectiveness of Antibiotic Medicaments Against Biofilm Formation of Enterococcus faecalis and Porphyromonas gingivalis.” Rujie Huang, a PhD Student in dental science mentored by Dr. Richard Gregory, was awarded the Shofu Dental Research Award for the project “Effect of Nicotine on Streptococcus gordonii Biofilm Formation and Aggregation.”

Upon completion of the awards ceremony, students had the opportunity to listen to poster presentations in the exhibit hall. Additionally, students got the chance to meet with sponsors and interact with vendors including: Delta Dental Foundation, Johnson & Johnson, Procter & Gamble/Crest, Shofu Dental Corporation, Indiana Dental Association, and the IU component of ASDA.

Research Day 2014 was a huge success and it won’t be long until we gear up for the next installment - so stay on the lookout for Research Day 2015 when springtime rolls around in April!
2014-2015 IUSD Student Research Fellows

These students will be completing individual research projects over the course of the next year and will be presenting at IUSD Research Day 2014 in the spring!

**DDS Class of 2016:**

**Laura ALBRECHT**
Project: Comparison of primary, secondary and tertiary nicotine and CSC exposure on *Streptococcus mutans* biofilm formation

Faculty Mentor: Richard Gregory, Oral Biology

**Michael DAETWYLER**
Project: Utilizing cone-beam computed tomography (CBCT) to guide endodontic access through full-coverage restorations

Faculty Mentor: Ygal Ehrlich, Endodontics and Ahmed Ghoneima, Orthodontics and Oral Facial Genetics

**Blake BALLenger**
Project: Thrombopoietin release from chitosan coated bioactive glass scaffolds

Faculty Mentor: Gabriel Chu, Division of Dental Biomaterials, Restorative Dentistry

**Joshua EVANS**
Project: Bi-Mix antimicrobial scaffolds for regenerative endodontics

Faculty Mentor: Marco Bottino, Division of Dental Biomaterials, Restorative Dentistry

**Chau LEMINH**
Project: Effect of nicotine and CSE on *Streptococcus sanguis* bacteriocin production on *Streptococcus mutans*

Faculty Mentor: Richard Gregory, Oral Biology

**Stuart RYAN**
Project: Antimicrobial Effects of TAP-mimic Antibiotic-Containing Scaffolds on *A. naeslundii*-Infected Dentin Biofilm

Faculty Mentor: Marco Bottino, Division of Dental Biomaterials, Restorative Dentistry
2014-2015 IUSD Student Research Fellows (Cont.)

**DDS Class of 2016 (Cont.)**

**Corrie VanWanzeele**
Project: Pilot study to evaluate the validity of a periodontal disease risk assessment tool
Faculty Mentor: Thankum Thyvalikakath, Restorative Dentistry

**Zachary BOZIC**
Project: Reasons for referring child patients in Indiana: A survey of general dentists
Faculty Mentor: Joan Kowolik, Pediatric Dentistry

**Nicholas BRASSARD**
Project: Comparing the efficacy of 3-D scanning of orthodontic impressions and stone models in generating digital diagnostic models
Faculty Mentor: Ahmed Ghoneima, Orthodontics and Oral Facial Genetics

**Nadine FERBINTEANU**
Project: Assessing the reliability of digital models: comparing plaster, laser-scanned and cone-beam computer tomography models
Faculty Mentor: Ahmed Ghoneima, Orthodontics and Oral Facial Genetics

**DDS Class of 2017:**

**Mark VAUGHN**
Project: Effect of probiotic species on planktonic growth and metabolism of *Streptococcus mutans*
Faculty Mentor: Richard Gregory, Oral Biology

**Philip HOYT**
Project: Assessment of caries excavation techniques using visual examination and QLF-D
Faculty Mentor: Armando Soto, Preventive and Community Dentistry

**Molly OSTER**
Project: Effect of shock and fixation timing on the inflammatory response and metabolic changes in orthopedic trauma
Faculty Mentor: Gabriel Chu, Division of Dental Biomaterials, Restorative Dentistry
Dean John Williams, Executive Associate Dean Michael Kowolik, and Associate Dean for Graduate Education Richard Gregory traveled to Riyadh, Saudi Arabia at the end of October for talks and presentations with King Saud University School of Dentistry on formalizing a plan to expand the large number of MSD and PhD KSU students currently coming to IUSD for postgraduate training in one of our MSD certificate CODA accredited clinical or non-CODA accredited programs and our PhD Dental Science Program. Currently, out of our approximately 90 MSD students, 13 are Saudi with 9 of those coming from KSU, while out of our current 13 PhD students, 8 are Saudi and 7 of those are from KSU, supporting the evidence for the large connection we have with KSU.

The discussions were fruitful and we will be following up our talks with more collaborative planning. While Drs. Williams, Kowolik and Gregory were there, Indiana University President Michael McRobbie and the President of KSU, Badran Al Omar, signed a letter of agreement for our two universities to continue to work together on these collaborative plans. It was clear that the major reason for President McRobbie’s visit was to support our IUSD discussions with KSU School of Dentistry. For more details on President McRobbie’s visit to Saudi Arabia please see:

D3 Student Researchers Present at Esteemed Conference
by Philip Hoyt, D2

During the weekend of October 31 through November 2, two IUSD dental students presented their research projects at the 2014 Hinman Student Research Symposium in Memphis, TN. The event was held at the historic Peabody Hotel and consisted of presentations from the top student researchers across the nation.

D3 student Blake Ballenger presented his work, “Thrombopoietin release from chitosan coated bioactive glass scaffolds.” He worked with Dr. Gabriel Chu on the project.

D3 student also Zach Bozic presented his work, “Reasons for referring child patients in Indiana.” He worked with Dr. Joan Kolowik on the project.

Both students said it was a wonderful experience not only to present their abstracts at the symposium, but also to listen to the work of other dental students. After returning, Zach said, “It was very rewarding collaborating with fellow dental students from across the country and around the world. I would recommend attending the conference to anyone.”

The weekend consisted of several research exhibits, a magnificent banquet, and even a tour of Elvis Presley’s famous Graceland mansion. Both Ballenger and Bozic strongly encourage fellow students to apply for the Hinman Symposium next year.
A Look Inside the Life of a Faculty Research Mentor

By Philip Hoyt, D2

Dr. L. Jack Windsor is a very accomplished educator and faculty researcher. He is extensively involved in research endeavors throughout IUSD as well as the surrounding IUPUI campus. He teaches Molecular Cell Biology at the dental school while conducting laboratory research primarily involving Matrix Metalloproteinases (MMPs) and collagen. His CV is longer than most Christmas lists and it cites one impressive achievement after another. He has taught everything from General Biology and Botany at Samford University to Molecular Cell Biology and Graduate Oral Biology at IU and MOI Universities. His involvement in research is even more extensive, working with a plethora of students ranging from undergrads to post-docs. His work has been published in reputable peer-reviewed journals such as the Journal of Dental Research, Journal of Prosthetic Dentistry, JADA, and the Journal of Endodontics just to name a few. I decided to investigate what brought this brilliant man to not only IUSD, but into research in the first place. He graciously accepted an interview and shared some information with me about his life, achievements, and wisdom within the field of dental research.

Q: What is your educational background?

A: I grew up in rural Alabama, with only 13 seniors in my graduating class. I was the Valedictorian, and got a scholarship to go to Samford University (a Baptist College in Birmingham, Alabama). My mentor paid me to get my PhD at the University of Alabama in 1993, and got my first research grant shortly after on rheumatoid arthritis and the role of MMPs in that process.

Q: What made you interested in research?

A: What got me hooked was after an interview, my mentor called me repeatedly asking if I would take the job. His persistence led me to say yes. What I found was that research is all about problem solving and critical thinking, using the scientific method to figure things out. Nature is smarter than we are, but by asking questions and knowing how to ask and answer them, we can interpret data and think through it. I always loved critical thinking and problem solving. Doing manual labor (cutting logs, working in automotive centers, etc.) made me want to use my brain instead. Research is just one aspect of critical thinking. It allows me to expand my thinking, and not limit myself to what is known. I love setting out to find out how stuff works and fix things. Dentistry is all about critical thinking and problem solving, identify the problem, remove that, assess whether that fixed it or not.

Q: What current projects are you working on?

A: A PhD student brought traditional botanical or home medicines from his home country and accidentally found that one promotes cell survival and bone and cartilage formation. There might be use there in osteoporosis or enhancing bone formation and repair. I'm working with Purdue to see if they can isolate the active ingredient. I'm also working with Drs. Bottino and Platt to help make amalgams last longer, and with Karen Gregson to make resins last longer also. One reason resins fail is because the dentin etchant activates MMPs, which cleave collagen that's demineralized, causing the bond to weaken over time. In resin polymerization, incomplete TEGDMA polymerization can leach into surrounding tissues. This can cause pulp or gingival fibroblasts to increase secretion of hydrolase, which cleaves resin composite polymers into TEGDMA monomers, creating a positive feedback mechanism leading to resin failure. So we asked, can we add MMP inhibitors to resin adhesive in a localized fashion to extend the lifespan of resin composites? I had a paper accepted in JDR looking at this – specifically nanotubes with MMP or hydrolase inhibitors to extend resin composite longevity.

Q: What is it like to have duties increased as a faculty member while maintaining research?

A: It's challenging, I like both and it's hard to decide between the two. I also like helping out and providing service. I was the President of Faculty Council for 4 years and got to interact with the Chancellor of the University and make some impact, get some policies changed. You could say I'm a jack-of-all-trades, and a master of none. I love to see students when it clicks, the "Ah-Ha" moment [in research]. But variety definitely keeps me energized; doing something too much will burn you out.

Q: What would you say to a student interested in research but doesn't know where to start?

A: Come have a chat with me. What are you interested in? I have people come in all the time. My research spans such a broad area, most of the time I can make it fit in with my research. MMPs are involved in almost any process, so I listen. Doesn't matter if you haven't done research before, if you have the motivation and are willing, we can talk. I leave it up to the student; I don't dictate, “This is the only thing I have for you”; instead I ask, "What do you want to do?" I'm going to make them think to start with. It's all about initiating a thinking process, and I'm not going to do all the thinking for you. Research is all about working together. Here, diversity doesn't matter – race, culture, etc. doesn't matter. Research matters. We don't focus on the differences, just focus on research. I like to create an environment where everyone is helping everybody.
Thank you for your interest in the latest edition of the Student Research Initiative! We would like to extend our most sincere gratitude to Indiana University School of Dentistry and its faculty and staff for their ongoing support of student research. We aspire to continue production of this newsletter to help keep the campus informed of all of the exciting student research efforts going on in the dental community. The Student Research Initiative team would like to offer a special thank you to our faculty mentor, Dr. Richard Gregory, for his photographs, inspiration, and guidance in producing this second edition newsletter.

IUSD Student Research Group Officers

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