NEW! Research Travel Grant Available

The Vernon Brightman Research Society at Penn Dental Medicine is pleased to announce that it is accepting applications for the Dental Research Travel Grant. This is a highly competitive scholarship open to Penn Dental students conducting research.

see TRAVEL, Page 8
Hello Penn Dental Medicine,

Vernon Brightman Research Society (VBRS) is pleased to present the 2018 Spring Edition of our newsletter, Articulator. We as a student body are fortunate to be part of an institution that is fortified with a wealth of opportunity in the realm of research. VBRS continues to endeavor to forge and promote relationships between Penn Dental students and appropriate resources, faculty and research prospects available to us not only here at PDM but also the various schools such as Penn Med and Penn Engineering.

We started out this year with our annual Research Proposal Writing Workshop where seasoned student and resident researchers provided guidance and feedback on attributes of an ideal proposal. This event was tailored towards students who were interested in applying for a research position through the Summer Research Program or Honor’s Research.

This year, VBRS hosted our major fundraising event, Oral Health Vendor Fair in April. This was a successful event with over 30% more vendors participating than we have had in the past. This event brought a variety of vendors in the world of dentistry to PDM to showcase what their companies have to offer while providing the student body, faculty and staff exposure to valuable products that may help improve their practice of dentistry. The funds raised from the vendor fair go to support travel grants disbursed to student researchers to enable them present their scholarly work at national meetings and conferences such as the AADR conference.

In continued promotion of student research, VBRS will be implementing a biannual VBRS Research Travel Grant application beginning Fall 2018 to provide improved accessibility of funds to research students. Please look out for more information in the fall.

As the spring semester comes to a close, we congratulate rising D2s on making it through their first year, welcome rising D3s into clinic this summer, cheer on rising D4s as they launch into their final year and wish graduating seniors all the best in all their endeavors beyond the walls of PDM.

We hope you all enjoy the 2018 Spring Edition of the Articulator!

Augusta Ankoh
Vernon Brightman Research Society, Vice President
Dear Readers,

This year, we focused on highlighting research stories by individual dental students and illustrated the numerous spring events hosted by VBRS at Penn Dental Medicine. It is my hope that you find the information about research opportunities helpful and see the impact that student research can make in the scientific community. I truly enjoyed serving as the Editor-In-Chief of *Articulator* for the school year 2017-2018. I believe that the *Articulator* will continue to grow and help the student body find their passion in research. I hope you enjoy reading the spring issue of VBRS newsletter.

I would like to give special thanks to the featured researchers and VBRS team for their time and helpful feedback. If you have any questions or wish to submit an article for the next newsletter, please do not hesitate to contact us at pdmvernonbrightman@dental.upenn.edu. Thank you for reading!

Warm regards,

Alisa Lee D’21 | Editor-In-Chief
RESEARCH DAY
May 10, 2018
The annual Research Day at Penn Dental Medicine brought faculty and students together to share their current progress and present their research findings. The day included a program of presentations by faculty and two invited speakers, along with 96 poster presentations, representing DMD-student and faculty and junior investigator research. It is an opportunity for students to showcase their depth and diversity of research across disciplines. Poster competition winners received a travel grant to attend the 2019 AADR, which is to be held in Vancouver June 19-22, 2019.

Iryna Mysnyk, D2
AADR Travel Grant Winner

I had the honor to present my work at the Research Day after having completed the Summer Research Program under the mentorship of Dr. Hydar Ali (Department of Pathology). I enjoyed presenting the results of my own work as well as learning about other projects. The beauty about doing research at Penn Dental is that regardless of what your preferences or past experiences are, you are sure to find a project that will spark your interests. Penn provides an enormous variety of opportunities, and Research Day is all about demonstrating that. Whether it is a classical bench research, a literature review, or a community service project – you can do it! I am very grateful for having had this opportunity. A special thank you to my mentor Dr. Hydar Ali and his lab.
**Poster Competition Winners 2018**

**Poster Title** | **Student** | **Faculty Advisor**
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NF-kB Promotes Mesenchymal Stem Cell Apoptosis and Inhibits Proliferation in Diabetic Fractures | Kralik, Richard M | Graves |
Binding Force Dynamics of Bacterial-Fungal Interactions in Oral Biofilms | Wan, Sherry X | Hwang |
The Role of FOXO1 on TGFβ1 expression in chondrocyte. | Sohn, Christopher M | Graves |
Inhibition of Human Mast Cell MRGPRX2 Signaling Involved in Chronic Urticaria and Periodontitis. | Mysnyk, Iryna, A | Ali |
Regulation of Mrgk2/GCEtq Interaction in MCs by GRK2 and its RH Domain | Omar, Noor Q | Ali |
Role of PERK in HIV-Associated Neurocognitive Disorders | Yu, Milo Jinho | Shenker |
Determining the Immunologic Profile of Primary HSV-1 Infection in Humans | Gandotra, Sahil | Cohen |
The Detection of a Potential Periodontitis Biomarker in Gingival Crevicular Fluid (GCF) | Chung, Grace | Jordan-Sciutto |

**Dentsply Sirona SCADA Award Winner**

| **Poster Title** | **Student** | **Faculty Advisor** |
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Antimicrobial and Physical Properties of PVM/MA Copolymer Incorporated Acrylic Resin | Lai, Christopher | Ozer |
Presenting at Research Day was extremely rewarding. I am very happy to be a part of Penn’s research day and to celebrate the huge collaboration that went into my research project that I presented. My research involved multiple departments here at Penn. Besides working with my faculty mentor, Dr. Ozer, we worked with Dr. Koo, Dr. Mante, and even those from Turkey and Brazil. We also had two predental undergraduate students who were research assistants on my project. Our research focused on inventing an antimicrobial dental material. My interest in this project is from my previous experience working at an orthodontic clinic. I noticed many orthodontic patients with acrylic appliances that collected so much biofilm formation. Together with Dr. Ozer, we decided to form our own antimicrobial acrylic to help remedy some of the issues we can see in any dental setting. I hope to continue working with Dr. Ozer in developing more novel dental materials to help improve clinical performance and ultimately better patient care. I’m grateful to be included in Research day and have an opportunity to represent Penn at the next Dentsply Sirona competition in American Association of Dental Research at Vancouver next year.
Travel

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The purpose of the grant is to encourage Penn Dental students to participate in research conferences that pertain to dental medicine. The grant will cover travel expenses and cost of conference for students to present their research.

Selection Criteria:

- Good academic standing throughout all semesters of dental school
- Letter of recommendation from the current mentor (preferably PI)
- 1-2 page personal statement describing your motivation to apply, current research project, and interest in the field.

Please look for more information in the fall. Applications will open in September 2018. Email your completed application to: PDMVernonBrightman@dental.upenn.edu.

Justine Chiou, D3
AADR Hatton Award Competition Finalist

At AADR conference, I presented on my research titled “The ESCRT Machinery is Recruited in KSHV Assembly and Egress,” a project investigating and analyzing key proteins in hosts that may be utilized by Kaposi’s sarcoma associated herpesvirus (KSHV). Not only did I present on the important relationship between Kaposi’s sarcoma to oral and systemic health, but also learned from other presenters’ research topics. From the macroscopic world of oral surgical procedures to the microscopic effects of small molecules in alleviating TMJ pain, these exposures to various research projects helped enrich my knowledge base in dentistry and aid in the development of critical thinking skills across subjects.

The AADR conference was an invaluable event that provided education and networking opportunities to enhance professional and academic development for dental students and dental health professionals beyond what is taught in a school curriculum with the recognition that learning is a life-long process. Through various professional interactions, we connected and shared our experiences to expand our views in dentistry and integrated the knowledge in hope to provide better patient care.
Hyun (Michel) Koo, DDS, PhD
Professor and Director of Research

Research is a key component in dental education, which provides many opportunities to explore intellectual curiosity and further develop critical thinking, traits as important for the future clinician as for the next-generation dentist-scientist. It gives opportunity to think broader, troubleshoot and discover perhaps new ways to improve patient care or find new mechanistic understanding for the etiology of a specific oral disease. Thus, conducting dental research can provide invaluable experience to help achieve the intellectual rigor necessary for the professional as being part of the broader field of Medicine. By embracing research, one will be without doubt more prepared to acquire and assimilate new knowledge and to adapt to the changes in practice and in the field of Dental Medicine as the science progresses.

Sherry Wan, D2

“I enjoy contributing to scientific progress to push for improvements that have the potential to improve health outcomes for patients.”
Penn Dental Medicine has a long history of supporting student involvement in research and Penn Dental Medicine is deeply committed to fostering student research across disciplines. The lessons learned and experiences gained through the research truly enrich students’ educational experiences on many levels. Scholarship is one of the central activities of a University and research is a key component of scholarship. Penn Dental has one of the strongest research portfolios of any dental school worldwide, which provides unique opportunities for students.

"...involvement in research provides the best teaching opportunity for developing critical thinking."
Whether in the lab or the clinic, research requires that we ask questions and synthesize information from myriad sources, some of which may be conflicting. It is well known that involvement in research provides the best teaching opportunity for developing critical thinking. The critical thinking skills developed along the way are invaluable not only for successful research, but also in practice as clinicians. Engaging in research also provides exposure to the broader aspects of academics and the opportunities for a career in academic dentistry. Building interest in research and teaching and the rewarding professional path they can offer is particularly important in this time of increasing dental school size and decreasing faculty. I hope that each student will consider the possibility of an academic career as academics can be combined with clinical practice to provide a rewarding life experience.

Our student researchers are tremendous ambassadors for the School, enhancing our prominence as they present their work at meetings and conferences across the country, including the annual AADR meeting through the school’s AADR Travel Awards program. From involvement in the Vernon Brightman Research Society and the Summer Research Program to pursuing the Research Honors Program, I encourage all of our students to take advantage of the unique research opportunities at Penn Dental Medicine. In addition, I applaud the level of excellence among our student researchers and their role in helping to advance science and practice through their many contributions to the school’s research enterprise.

Dana T. Graves, DDS, DMSc
Interim Dean, Penn Dental Medicine

Photo from Research Day 2018
What is “research”? A quick Google search lands us on a Wikipedia definition; “research comprises the creative and systematic work undertaken to increase the stock of knowledge”. Knowledge is power; an understanding of concepts gained through discovery becomes firmly rooted in our psyche, shaping our approach to healthcare challenges. Hence, exposure to and experience in research during one’s dental education provides the foundation for a generation of oral health care providers who are active consumers of the literature and proficient in critical thinking skills.

Scientific inquiry provides the framework for “creative and systematic work”. When answering a research question, we open our minds to possibilities, often those “outside the box” to answer “what-if” questions, otherwise known as hypotheses. Through an evaluation of peer-reviewed publications, we establish scientific methodologies that provide a systematic framework in which to answer such questions. Pre-doctoral research provides dental students an opportunity to foster these skills and build a “tool-kit” of life-long learning and innovation. Anecdotally, when asked why they want to do research, students often say, to increase their chances of a preferred residency, to pursue a career in Dental research, or to earn money. Yet as practitioners, when these former students evaluate new therapies, develop complicated treatment plans or consider novel operative therapies, they will rely on the critical thinking skills and systematic approaches developed during their research endeavors.

"Knowledge is power; an understanding of concepts gained through discovery becomes firmly rooted in our psyche, shaping our approach to healthcare challenges."

It is important to remember that clinical practice versus dental research is not an either-or-option – they are two digits of the same hand working together for maximal function. In contemporary dentistry, the creation of new knowledge is critical to deliver the best available treatment options to the broadest population. This knowledge is created through a progression from a basic science observation (creation of new knowledge), that is translated to clinical practice, which when implemented on a large scale, becomes a standard of care. Scientific discovery and the opportunity to pursue research fuels these changes providing increased quality of care, enhanced diagnostic capabilities, and an increased understanding of the link between oral and systemic disease.
Grace Huang, D1

How do you think your research impacts your professional and clinical career?

Having a research background has helped me to think more critically about and to seek a deeper understanding of everything I do. I consider my research experiences valuable not only because the pathogenic mechanisms of P. gingivalis and A. actinomycetemcomitans virulence factors I studied will be directly applicable to patients’ clinical presentations but also because they push me to more thoroughly consider all aspects of patient care. Also, patients want to understand the logic behind the procedures they’re having done and the materials that are being used on them, and being able to effectively communicate the rationale of the treatment plans will strengthen the trust between health care providers and patients.

Jennifer Caughey, D3

What inspired you to pursue your research?

Prior to attending dental school, I worked in a research lab in the cardiovascular division at the Smilow Center for Translational Research, where I assisted several post-doctoral candidates with their research projects involving the observation of various metabolic pathways in mice. As a first year dental student, I knew that I wanted to conduct my own research project and reached out to our biochemistry professor, Dr. Kathleen Battaglia, to see what she had available. Out of all of the projects that Dr. Battaglia had available in her lab, the one that interested me the most centered upon the observation of a specific metabolic pathway found within specialized cells found in the eye known as Retinal Pigment Epithelial (RPE) cells. Dr. Battaglia’s RPE project served as the perfect opportunity for me to take and apply the skills that I acquired from previous research experiences toward my own study, with the core of the RPE project involving performing microscopic eye dissection surgeries on mice and further evaluating isolated RPE cell metabolism at various times of day relative to light onset.
Q: What are the findings or results of your studies?

Very promising results indicated that there might be undiscovered links between mesenchymal stem cell-derived tissues and inflammation. We found that inflammation affects bone length, skin thickness, and fat distribution in our mice. We were surprised and thrilled at the same time.

Q: How will the results of your research be applied?

Our research would help us with therapeutic targeting of inflammatory protein to treat skin-related diseases that arise from dysfunctional mesenchymal stem cells.

Q: What role does your mentor play in your research project?

I was very fortunate to have Dr. Graves and Dr. Ko as my mentors. They are some of the smartest and kindest people I have ever met, and they are experts in their field. They guided me throughout my research, providing invaluable insights and expertise that made my research possible. They taught me what it meant to be a proficient researcher, and the experience forever changed my perspective.
Lansara Jaruthien, D3
What do you enjoy most about doing research?

There are many reasons that make research fun and exciting. Research is something new! Each project brings the scientific community just a little bit closer to discovering something that could make a difference, and it is a great feeling to know you made a contribution to that. However, my favorite thing about research is the people. Research gives me to the opportunity to collaborate with other professionals like myself, work under the supervision of knowledgeable and supportive mentors, and form long-term relationships that extend outside of lab.

Sahil Gandotra, D2
What kind of research interests you?

For the past 2.5 years I’ve been doing research in the field of virology. I started in undergrad studying Adenovirus, and moved on in dental school to study Herpes simplex virus. I remember in undergrad microbiology being told that it’s still contended as to whether viruses are living organisms or not, which on the surface seems like a very easy distinction to make. As I moved onto higher level microbiology, I became interested in the ability of viruses to hijack anything and everything possible to carry out their own functions while also various tactics to maximize whatever intrinsic function they have. This disjoint between the complexity of viruses yet our inability to characterize them as living organisms or just molecules working together to achieve a common goal is what really drew me into the field.
Research Proposal Writing Workshop

A group of dental students worked on their summer research proposal with seasoned student and resident researchers at Penn Dental Medicine. This event was tailored towards students who were interested in applying for a research position through the Summer Research Program or Honor’s Research.

Dr. Kang Ko D’15 (right) provided guidance and feedback on attributes of an ideal proposal.

Elizabeth Soulas, D2

What inspired you to pursue your research? What do you enjoy most about doing research?

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I was inspired to do research by the research mentors I had as an undergraduate student, and I am happy to say that it is still something I’m very passionate about! As my mentors, these individuals not only taught me valuable skills, but inspired me through their work. In particular, the immense potential to answer important questions that can lead to scientific breakthroughs that can ultimately impact lives. It’s this transformative potential for research to go from the lab and then to the hands of healthcare professionals to ultimately improve a patient’s life that propels me to continue research and keep asking questions.

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This year, VBRS hosted our major fundraising event, Oral Health Vendor Fair in April. This was a successful event with over 30% more vendors participating than we have had in the past. This event brought a variety of vendors in the world of dentistry to PDM to showcase what their companies have to offer while providing the student body, faculty and staff exposure to valuable products that may help improve their practice of dentistry. The funds raised from the vendor fair go to support travel grants disbursed to student researchers to enable them present their scholarly work at national meetings and conferences such as the AADR conference.
About Us

The Vernon Brightman Research Society (VBRS), named in honor of Vernon J. Brightman, former Penn Dental Medicine faculty member and strong supporter of student research, is the primary student research organization at Penn Dental. Since its inception, VBRS has helped numerous students find their niche in research at the School as it aims to promote interest, participation, and appreciation of the basic and clinical oral health research that keep dentistry a science and research-based profession. The society accomplishes this aim by hosting a number of events throughout the year such as the Introduction to Research Seminar Panel, Student Research Reception, and the Oral Health Fair/Student Research Day which includes a vendor fair as well as poster presentations from students who participated in a variety of summer research projects.
Upcoming Events:

Sep 2018  Travel Grant Application

Nov 2018  Summer Research Panel

Dec 2018  Research Mixer

Questions? Contact us at: PDMVernonBrightman@dental.upenn.edu