

WAKE FOREST UNIVERSITY · DEPARTMENT OF PHYSICS

2020 Physics Alumni Newsletter

The complete web newsletter, collected from its original articles.

ARTICLE 1 OF 4

2020 Alumni Award

[View this article on the Wake Forest Physics website](#)

In 2018 we implemented a new alumni award. The award is given to a Physics Department alumnus for exceptional achievements and/or service. The award is not limited to physics but covers all areas that our alumni excel in. If you can think of someone to nominate, please send a letter to the Department Chair, Daniel Kim-Shapiro or email (shapiro@wfu.edu) describing why that person is a good candidate for this award. Please send nominations by 12/1/2020. Note that the award will have a modest monetary component.

ARTICLE 2 OF 4

Recent Changes

[View this article on the Wake Forest Physics website](#)

Significant Changes Over the Past Year



Rick Matthews retired last summer after being at WFU for 41 years. He came to Wake Forest from the Naval Research Laboratory in 1979. He served as department chair from 1998 until 2007. In 2007, he was asked to join the university administration, first as Associate Provost and the following spring as Associate Provost for Technology and Chief Information Officer. Rick returned to the Department in 2014 but spent half of his time in the administration as Director of Academic and Instructional Technologies for the College. We wish Rick a happy and fulfilling retirement.

In the spring of 2019 we hired two new faculty members, Ilaria Bargigia and Ajay Srimath Kandada. Ilaria came to WFU in January of this year and we are very happy to have her here. Unfortunately, Ajay, who also planned to come in January has been held up and is still in Milan, Italy. His arrival has been held up by ongoing travel restrictions related to the corona virus. However, Ajay is co-teaching an online class on optics with Ilaria this semester.



Ilaria Bargigia received her PhD in Physics from Politecnico di Milano (Italy) and, before joining Wake Forest, she worked as post-doctoral researcher in Politecnico di Milano (Italy), the Italian Institute of Technology (Milan, Italy), and the Georgia Institute of Technology (USA). She is very excited about this new adventure at Wake Forest and really enjoyed teaching for the first time Physics 113 and Physical Optics and Optical Design to Wake Forest students. Professor Bargigia is eagerly looking forward to establishing her group here: she is an optical spectroscopist by training, and her interest focuses on the study of conjugated polymers for biological applications.



Ajay Srimath Kandada received his PhD in Physics from Politecnico di Milano, Italy and worked as a postdoctoral researcher in the Italian Institute of Technology, University of Montreal and Georgia Institute of Technology. He received the Marie Curie global fellowship from the European Commission while he was a postdoc. He was recently recognized as a Materials Emerging Investigator by the Journal of Materials Chemistry C. He is an optical spectroscopist with an interest in developing advanced optical tools to address pertinent questions in materials science. His teaching interests lie in introductory and advanced courses on Optics and Non-linear optical spectroscopy. While he is not yet in Winston-Salem due to the ongoing COVID travel restrictions, he is very eager to move to WFU and start his teaching and research duties.

Last winter we did a search for Rick Matthews' replacement and we were very lucky to be able to hire Steve Winter shortly before the pandemic caused the University to put all of the courses online in March and to have most of the students spend the rest of the semester at home.



Steve Winter received his PhD degree from the University of Waterloo (Canada) in 2014, completing research in the group of Richard Oakley in the area of strongly correlated organic materials. His thesis was selected for the Canadian Council of University Chemistry Chairs award as the top thesis in Chemistry by the Canadian Chemical Society. He subsequently moved to the Institute for Theoretical Physics in Frankfurt (Germany) as an NSERC postdoctoral scholar within the group of Roser Valenti and continued there as a Junior Project Leader. His research career has spanned a variety of topics in chemistry and physics, which

has included a combination of synthetic, experimental, and theoretical efforts. Before joining the faculty at WFU in Fall 2020, he had coauthored over 45 papers in materials research. His current research interests include theoretical modelling of complex materials with coupled spin, charge, and orbital degrees of freedom.

WFU Physics Department Of course the pandemic has resulted in some significant changes as well. As you have probably heard the University responded to the pandemic and to orders issued by the Winston-Salem mayor and later by the North Carolina governor by closing the campus to most faculty, staff, and students in mid-March and putting all classes online. It was a challenging time, but the faculty, staff, and students all pulled together and we made it through the spring semester. Over the summer things gradually opened up and the laboratories in Olin that had been shut down were able to start operating again. Our usual summer school courses in physics were taught entirely online. Those faculty members who did not teach summer school courses underwent two weeks of part time training in teaching online courses during the summer.

Classes began for the fall semester in late August with a delay of just a couple of days. Faculty were given the option of teaching face to face classes, blended classes with some students physically present and some attending online, and completely online classes. In all classrooms everyone is required to wear a mask and observe social distancing at all times. As a result many fewer students are allowed into a classroom than normal. Therefore those physics faculty who prefer to teach with students present are teaching blended classes. So far things have been going well. Because of an uptake in the number of students infected with the covid 19 virus the University has changed its status from Yellow, which is the “new normal”, to Orange. So far as teaching goes there are no changes, but there are changes in the daily lives of the students related to campus dining and the cancellation of some campus events. The plan is to have the students here until the Thanksgiving holiday and then to have them not return. Instead classes will again be online for the very last part of the semester.

The spring semester is scheduled to begin in late January with no spring break next year. The plan in the Physics Department is to again have a mix of blended classes and completely online classes.

ARTICLE 3 OF 4

Awards

[View this article on the Wake Forest Physics website](#)

Awards Received by Faculty, Staff and Students



Fred Salsbury

Fred Salsbury has received the *Scott Family Fellowship Award*. The award began on July 1, 2020 and lasts for three years. He was given the award in recognition of his “outstanding record of teaching and scholarship”.



Paul Anderson

Paul Anderson has been elected a *2020 Fellow of the American Physical Society (APS)* by the APS Council of Representatives upon the recommendation of the Division of Gravitational Physics . This honor is in recognition of contributions to the understanding of quantum field theory in curved spacetime applied to black hole and cosmological spacetimes. Professor Anderson also received the Physics Department *Excellence in Teaching Award*.



Lainey Drake

Physics and Theatre Major Lainey Drake earned the prestigious *Brooke Owens Fellowship* last spring. As a Brooke Owens Fellow, Lainey spent the summer as an engineering intern with Virgin Galactic in Las Cruces, New Mexico.

The following Awards were presented at our first virtual Annual Physics Department Awards Ceremony in May:



Gloria Stickney, Physics department Business manager, received the *Outstanding Service Award*



Andrew Zeidell received the *Outstanding Graduate Research Award*



Graduate Student, Ali Daraei, won the *Outstanding Teaching Assistant Award*





Graduate Students, Hamna Iqbal and Melissa Pashayan, were co-recipients of the *Peer Mentor Award*



Undergraduate Students, Robert Bradford and Jiqing (Jacquelyn) Zhu were co-recipients of the *Speas Award*

ARTICLE 4 OF 4

Faculty Updates

[View this article on the Wake Forest Physics website](#)



Daniel Kim-Shapiro

Looking back over the past year, the often quoted Dickens quote comes to mind “It was the best of times, it was the worst of times ...” Overall, there were some very good times and we made the best of the bad ones.

For the department, we recruited another stellar new faculty member, Steve Winter. We have adapted well to teaching and doing research during the pandemic. We have held fast to our goals of offering an excellent formal education in Physics, while collaboratively making discoveries and increasing knowledge. Our teams of faculty, staff, Grad students, and undergraduate students have persevered and are continuing to do so.

My lab had a great time before COVID presenting work at the SFRBM meeting in Las Vegas (and seeing Aerosmith while we were there). Two undergrads came with us, Fernando Rigal and Jacqueline Zhu (who is now studying at Harvard as a graduate student).

I enjoyed teaching Biophysics and Introductory Physics (PHY 114, as an overload) last Spring and pivoting to online classes was not too bad.

As a pathologist (essential worker) my wife has been going to the hospital straight through any lockdowns. My 3 boys (two in high school and one in college) are taking class online, so we sometimes have 4 zoom meetings going on at once. In between my kids’ classes, I like to take breaks with them; it’s like I am back in high school hanging out in the hallway.

I really enjoyed seeing and hearing people at the Chat with the Chair. Stay in touch – reach out anytime and I hope to see you soon.



Paul Anderson

Paul Anderson

This past year has been a busy year of teaching, research, and adapting to the pandemic. It was a challenge suddenly switching to teaching online last spring. This fall I'm teaching the upper level quantum mechanics course as a blended course with some students physically present and some attending via zoom. It seems to be going well and I prefer it to teaching entirely online.

Research has gone well during the past year. Two papers have been published with former graduate student Richard Dudley and two external collaborators. One is on particle production in the interior of a black hole and the other focuses on certain quantities indirectly related to black hole evaporation that have been computed for certain models of Bose-Einstein condensate analog black holes. Ritchie also finished writing his dissertation and graduated last summer. A paper with Eric Carlson and graduate student Taylor Ordenes relating to certain quantum effects that may have occurred in the early universe has also been published. Two preprints have been posted on the e-print archive. One is with graduate student Shohreh Gholizadeh Siahmazgi, former undergraduate Ray Clark, and an external collaborator relates to the computation of quantum effects due to the formation of a black hole. The other preprint is with graduate student Ian Newsome and former undergraduate Robert Link as well as two external collaborators. It relates to the validity of a certain type of approximation that is often used to describe what happens when particle production occurs because of the presence of a strong electric field.

I feel very honored to have received the Physics Department Excellence in Teaching Award last spring and to have been elected as a Fellow of the American Physical Society this fall.



Keith Bonin

Last year was the second year that Keith Bonin served as Associate Provost for Research and Scholarly Inquiry. Responsibilities include supervising and enhancing research endeavors at all of the schools at Wake Forest, as well as the College. Last academic year he chaired a Research & Discovery Task Force to articulate strategies that will help Wake Forest to significantly increase externally funded research in the future. The Task Force's work was interrupted by the pandemic, but it has resumed this academic year. He continued to work on a 5-year NIH grant (as a co-PI) to study chromatin dynamics in human cells with the goal of understanding the mechanisms of therapy induced cancers. These are cancers that are induced by the cancer treatment, and are usually fatal in most cases. Last year we had 5 undergraduate students, two graduate students, and two postdocs engaged in research on this project. Prof. George Holzwarth also worked on this project as a collaborator throughout the year. Finally, he again taught the Intermediate Physics lab course, which is a lab course tightly aligned with the Modern Physics course offered to sophomore Physics students.

***Martin Guthold***

Time flies, and it has been three years since the last update from the Guthold lab (fall 2017). So, there is quite a bit of exciting news from the Guthold lab and its current and recently graduated members.

Four undergraduate students graduated in 2018; Chris Coleman (BS, 2018), Josiah Low (BS, 2018, Honors), Mary Kinney (BS, 2018, Honors) and John Diaz-Silveira (BS, 2018). Josiah and Mary graduated with honors. Josiah is in Medical School at the David Geffen School of Medicine at UCLA, Mary is in Medical School at Indiana University School of Medicine (Evansville), John completed his MS in Physiology at NC State in 2020 and is now working at LabCorp (probably very busy keeping up with COVID-19 testing).

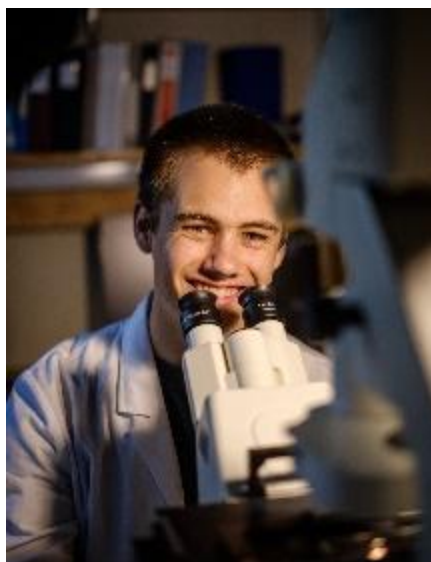


Three undergraduate students graduated in 2019, Austin French (BS, 2019), Kevin Ramirez (BS, 2019) and Jacquelyn Sharpe (BA, 2019). Jacquelyn graduated with honors. Jacquelyn was working for the Peace Corps in Tonga!

All the best wishes to our graduates. You will have a bright future!



Currently, the following student researchers are working in the lab. Three undergraduate students – Rich Pope, Annie Brigham and Caleb Sawyer; four graduate students – Hyunsu Lee, Ali Daraei, Melissa Pashayan (Macosko lab) and Nouf Alharbi. In addition, former graduate student, Dr. Stephen Baker (PhD, 2015), returned to Wake Forest (Guthold/Bonin lab) as a teacher/scholar post-doc.

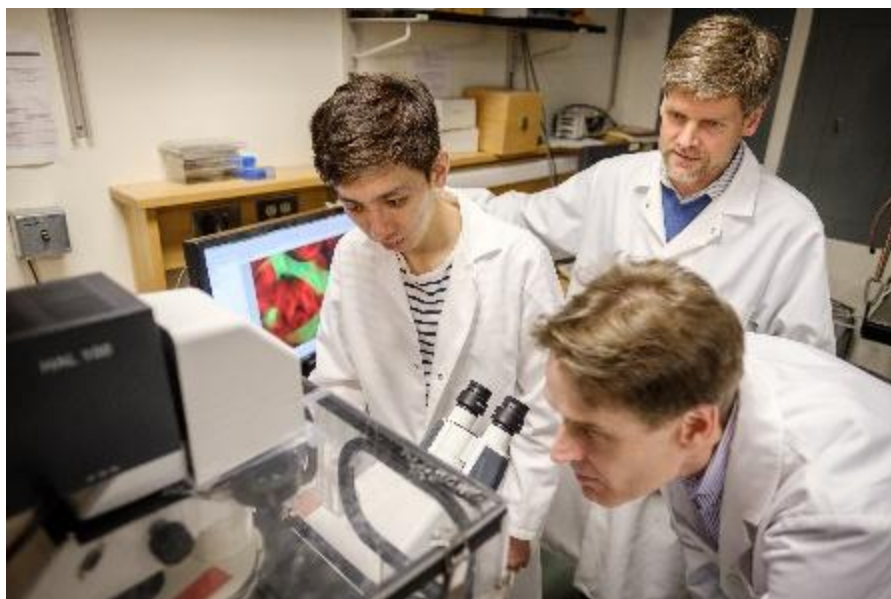


All the excellent work by the research team resulted in several high-impact publications. The Guthold lab published papers in *Thrombosis and Haemostasis*, *Annals of Biomedical Engineering*, *Redox Biology*, *Nature Communications*, *Advanced Electronic Materials*, *Journal of Molecular Recognition*, and abstracts in *Biophysical Journal*. Some of the work resulted from great collaborations with the Kim-Shapiro and Jurchescu labs.

Two of our graduate students won departmental awards for their wonderful work. Hyunsu Lee received the 2018 Peer Mentor Award and Ali Daraei received the 2019 outstanding TA award.

Dr. Guthold organized the 25th International Fibrinogen Workshop at the Graylyn International Conference Center, June 3rd to June 7th, 2018. About 100 attendees discussed the latest advances in basic, clinical and bioengineering research relating to fibrinogen and factor XIII.

In 2019, we moved our lab from Olin 202 to Olin 213 and Olin 216 (now shared with Drs. Macosko and Kim-Shapiro). Olin 202 will be used by one of our newly hired assistant professors, Dr. Ilaria Bargigia. We continue to do research in hemostasis & thrombosis (properties of fibrin clots); cancer and thrombosis; mechanical and structural properties of normal and cancerous mammary (breast) cells; electrospun nanofiber properties; and drug discovery. This research is supported by grants from the NIH, the Wake Forest Center for Functional Materials and a Wake Forest Collaborative Grant.



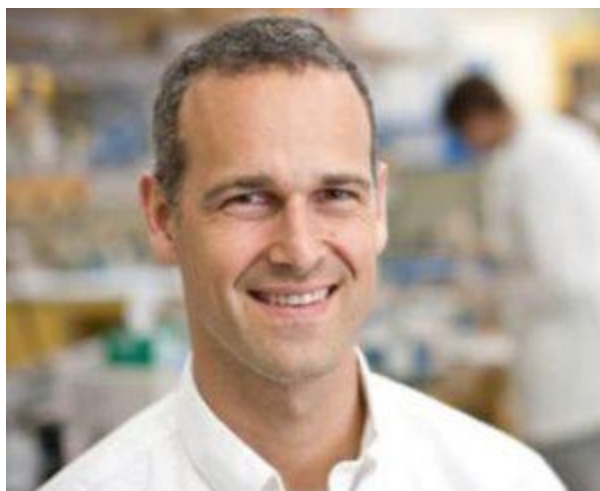
Recently, I got the chance to catch up with some of our lab's alumni. I had a great phone conversation with Patrick Nelli (BS, 2009), who is now the chief financial officer at Health Catalyst. I also met up with Dr. Samrat Dutta (PhD, 2011) at the Biophysical Society Meeting in San Diego. Samrat is now working for Bruker. I heard from Dr. Christine Helms (Carlisle) (PhD, 2010), who was promoted in 2019 to Associate Professor with tenure at the University of Richmond. Congratulations, Christine! I also ran into Mary Kinney (BS, 2018) at the airport in Paris! She was traveling Europe (before starting Medical School), and I was on my way back from a conference on cell adhesion in Aussois (France). It is great hearing from former lab members. Let's stay in touch!

Despite the COVID-19 pandemic Wake Forest has stayed open, and so far the disease cases are relatively well under control. Teaching is often done in a blended fashion, in which part of the students are in the classroom and some are online (with the lectures streamed).

In family news, Wei Li (PhD, 2015), gave birth to a healthy baby boy in 2020. Congratulations!

The Guthold family is doing well. My wife, a lawyer for the city of Winston-Salem, is keeping the city out of legal trouble. Our daughter, Melissanthi, is a senior in high school, and our son, Alexander, is in 2nd grade (with school online). My son, Felix, got his Bachelor's degree and is working as a PA in a Cardiology unit at a hospital in Stuttgart (Germany).

We would love to hear from all alumni.



Jed Macosko

Prof. Jed Macosko continues to use big data to develop a website that traces the influence of famous scientists and academics. He has enjoyed interviewing these influencers and uploading the videos to <https://academicinfluence.com/interviews> when he is not doing research with George Holzwarth, Melissa Pashayan, and Doug Lyles (Biochemistry). He has been pleasantly surprised by the similarity in what makes for successful biophysics research and successful big data research



Rick Matthews

I retired July 1 after 41 years at Wake Forest. I hope to continue to stay connected with the department and the field even in my retirement, and I continue to hold Research Professor status. Retiring was not an easy decision. I sorely miss the daily contact with students. But I look forward to spending more time with my grandchildren while they still want to spend time with me! The timing was fortuitous, as my father broke a hip in August, and I have been able to better assist my parents through his recovery and their adjustments in lifestyle.

This past year has been remarkable in other ways, as you must be aware. The transition to all-virtual instruction in the spring was a challenge, but it turns out that the radical restructuring of how I teach translated beautifully to online learning. I adopted a “flipped” class approach in 2014, and the results have been remarkable. For those interested in seeing what I did, you can view [a pre-print of an upcoming publication](#) that describes what we did and how it increased in student learning. Several spring semester students commented that this approach seemed perfectly designed to transition online. We used Zoom breakout rooms combined with Google Jamboard to continue our in-class small group problem solving.

Part of my responsibilities since 2014 has been leading the Instructional Technology Group, a team of 14 professionals with expertise in both technology and instruction who are the primary support for faculty enhancing their classes through technology. The pandemic made their expertise and support invaluable, as faculty had to jump into multiple distance learning applications simultaneously.

Many asked this spring if I wished I had retired before the pandemic struck. In fact, I am glad I was able to be a part of this challenge. In some ways, the pandemic affirmed my belief in the value of technology-enhanced teaching. My final colloquium was scheduled for this spring, on the topic “41 years of teaching and technology,” captured in [this YouTube video](#).

I hope that Fall 2021 will be “normal”, and I hope that I can see you face-to-face for a *real* homecoming.



Fred Salsbury

Fred Salsbury

The Salsbury group has had a slow, but successful year, as Dr. Salsbury recovers from a broken ankle that had him working from home, even pre-COVID, for 1/2 of the fall semester. A junior graduate student, Dizhou Wu, is working on Thrombin mutant simulations with an eye towards eventually expanding our expertise in

applying machine learning to simulation analysis. We also continue our collaborations in drug discovery through the Cancer Center and its Crystallography and Computational Biosciences Shared Resource that Dr. Salsbury co-directs. Our collaborations with Yan Lu, a former postdoc in our group who is a faculty member at Xidian University, focusing on amyloids relevant to Alzheimer's continue as well. Dr. Salsbury was awarded the *Scott Family Fellowship* for three years in recognition of his research accomplishments.

Dr. Salsbury continues to teach intro physics as a flipped-class, which seems to work well during the transition to simultaneous-blended classes this semester. He also continues to incorporate computational techniques into classic mechanics and the graduate statistical mechanics class. Dr. Salsbury has also taken over the first half of the second intermediate lab and has tightly woven that most of that class with mechanics now. The lab also now has a brief introduction to chaos which isn't always covered in mechanics.

This fall, the department had to change teaching modalities, and Dr. Salsbury is using the simultaneous-blended modality for Physics 113. Up to 1/3rd of the class may attend in-person, and everyone logs into a Zoom session so that they can see the board, and work problems either on their own or in break-out rooms. So far most of the class is choosing to attend remotely, and the class is doing well.



Steve Winter

This past academic year has been quite eventful for me (as I imagine it has been for many others). I arrived in the Forest this Fall, to start a new research group in Computational / Theoretical Materials research. I am coming from Frankfurt, Germany, where I previously led a project investigating exotic magnetic materials. After interviewing at WFU last Winter, I was more than excited to join the supportive and collegiate department here – especially having felt an emphasis on both pedagogy and research.

Before leaving Frankfurt, a graduate student (Kira Riedl) I co-supervised there obtained her Doctorate with highest possible grade. We are very proud of her. This past year involved quite a lot of travel before the onset of COVID-19, including a long stay at the Kavli Institute for Theoretical Physics in the Fall of 2019, which spurred several fruitful collaborations. However, it is hard not to mention the impact of COVID-19. After the unexpected cancellation of the American

Physical Society meeting in March, a colleague of mine anticipated, “We are about to witness history”. I think not many people recognized the truth in his words at that time. While we all continue to navigate this new landscape of social distancing and zoom calls, I am looking forward to new opportunities and friends in the Forest.