

DEPARTMENT HEAD'S MESSAGE

I am proud to present this annual Via Report summarizing the department's accomplishments during the 2017-2018 academic year. The Charles E. Via, Jr. Department of Civil and Environmental Engineering has continued to build upon its outstanding reputation and continues to produce excellent and successful graduates each year.

Among those excellent students are our Via Scholars. I know that the Via family would be proud of the work these students are doing and their service to the profession and society. Take a moment to look through their profiles and learn more about each of these scholars. Hopefully, you will have the opportunity to interact with them when you visit campus, through professional activities, or as future employers. Each year, with the influx of these new scholars, we, as faculty, are reminded how fortunate we are to be part of the Via Department of Civil and Environmental Engineering.

The strength of our department has always been and continues to be our students, faculty, community, and culture. Our students' success is a testament to their drive and commitment, but also to the exceptional faculty that we have to lead them along the way. This semester, we will be adding four new faculty to our outstanding team of educators: Dr. Alexander Brand, Dr. Stan Grant, Dr. Megan Rippey, and Dr. Rodrigo Sarlo. You can read more about each of them on page nine.

There are also several articles on the research efforts that are in progress within the department and the accomplishments and honors that our faculty have been awarded this year. These are just a small portion of the work that our faculty are doing to improve the world that we all live in. Albert Einstein once said "Engineers create that which has never been." Our faculty and students continue to push the boundaries to discover new and innovative ways to improve the civil and environmental engineering profession.

We just welcomed a new group of students to CEE at the start of the semester. It is very gratifying to witness the popularity of our programs and we certainly look forward to doing our part in educating future members of our profession.

I'm looking forward to another exciting year and, once again, thank you for your support. I'd like to give a



special thanks to all of our alumni, friends and colleagues who have generously supported the department. These gifts are helping to develop a new generation of engineers ready to invent the future and improve the world we live in. Read more about this on page four. Please visit cee.vt.edu and join us on Facebook and Twitter to follow the latest news and research going on in the department.

With kind regards,

A handwritten signature in black ink that reads "Sam Easterling". The signature is written in a cursive, flowing style.

Sam Easterling
Montague-Betts Professor of Structural Steel Design
and Department Head

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DEPARTMENT HEAD	W. Samuel Easterling
EDITOR AND DESIGNER	Courtney Sakry

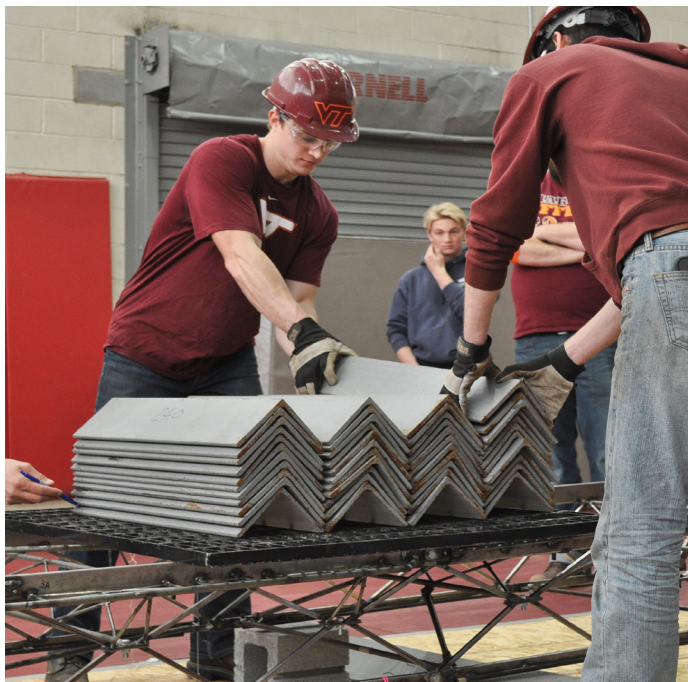
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UNIVERSITY BUDGET 101: WHY PHILANTHROPY MATTERS TO OUR DEPARTMENT

The CEE alumni board have continuously expressed that they do not fully understand the importance of philanthropy to the department, general aspects of the university budget, and the ways that philanthropy helps differentiate our program in a positive way. When they became more engaged with the department, it was then that it made more sense. The alumni board has encouraged me utilize the Via Report to provide an overview of some aspects of the university budget.

I cannot explain the university budget in only a paragraph, but my intent is to provide clarification to a few misconceptions. The department operates with funding from different sources, including: tuition and tax revenue from the Commonwealth of Virginia, externally obtained research funding, and philanthropic gifts. Tuition and tax revenue are predominately used to pay faculty and staff during the academic year. Research funding is obtained through competitive proposals developed by faculty and is used to support the projects, including graduate student stipends and tuition, which the sponsors have specifically chosen to fund. Philanthropic gifts to the department by alumni, friends of the department, foundations, and corporations are used to support students and faculty. While unrestricted gifts provide support at the general university, college, or department level, many are designated by the donors to specific purposes, such as an undergraduate scholarship, graduate fellowship, or faculty professorship. It is not uncommon to hear or read in the

media that the university should use money for students and faculty instead of building athletic facilities or dormitories. Auxiliary enterprises as described on the Office of Budget and Financial Planning webpage, are entities that exist, per Code of Virginia, to furnish goods or services to students, faculty, or staff. A very important aspect of the funding of auxiliary enterprises is that they are financially self-supporting and do not receive tuition revenue or state tax dollar appropriations. These entities charge for services provided and revenue is generated through cash sales and student fees. Examples of auxiliary enterprises are athletics,



dorm, and dining operations - and all are primarily funded through sales of goods and services along with donors that designate their support toward these specific initiatives.

So, why does philanthropy matter to our department? Simply put, the gifts we receive from alumni, parents, and friends provide the department with the ability to support students and faculty in ways that we could not do otherwise. The support provided by our alumni and friends help to

differentiate our program. Through scholarship and fellowship funding, we are able to attract and support our outstanding students. The funding provided for faculty fellowships and professorships enable us to recruit and retain outstanding faculty. Philanthropic gifts support student programs, study abroad opportunities, student participation in professional conferences, and classroom or laboratory renovations. Collectively the faculty, students and staff that we are able to recruit, support and retain differentiates us from many of our peers.

Recently, donations to the university seem to support high profile building projects, departmental naming, and other major endowments. The size and impact of these gifts generate visibility that positively increase recognition and reputation for Virginia Tech. However, gifts made on an annual basis that support the department - not of the amount needed to establish endowments - are critical to our success. During the first annual Giving Day held earlier in the year, I was proud to see that the number of gifts made by CEE alumni and friends was among the highest in the college. Likewise, the CEE alumni board members lead the way in giving rates among departmental boards in the college.

My sincerest thanks to you for taking the time to read this and especially to those who give so generously to our department. Your support is one of the big ways we are able to differentiate the department among our peers. I know that I can speak for our students, staff, and faculty when I say that they sincerely appreciate your support as well.

Please do not hesitate to contact me at ceedepthead@vt.edu if you have questions or simply would like to discuss any of the topics further.

UNDERGRADUATE SCHOLARSHIPS

CE Alumni Board Scholarship

Conor Dane
William Hiatt
Connor Leslie
William Roxby
Aleia Warren

Kenneth R. Ayers '80 Memorial Scholarship

Emma Helfrich
Sayed Rohani

Kelso Baker Scholarship

Elliott Delp
Cassidy Moran
Daneil Ott
Rusty Rouiller

Michael Baker Corporation Engineering Scholarship

Jack Popelka

Balzer & Associates Scholarship

Adam Caretti
Tierney Lesinski

James L. Bland Civil Engineering Scholarship

Peter Vaccacio

Charles and Patricia Brown Scholarship

Darko Stanisic

Everett Carter Memorial Scholarship

Paige West

William A. Caruthers CE Scholarship

Connor Hays
Erin Hrovatic

Joseph and Jane Christenbury Memorial Scholarship

Keneil Gordon

Civil Engineering Class of '58 Scholarship

Anna Bohlmann
Casey Britt
Kyrsten Dallanegra
Elizabeth Smith
Daniel Szalecki

Warren F. Cline Scholarship

Caleb Wade

Stanley and Francis Cohen Scholarship

Daneila Charles
Zabih Safi

John DeBell Civil Engineering Scholarship

Kyle Hogan

Dewberry Scholarship

Jacob Golub

Walter and Mary Ruth Duncan Scholarship

William Roxby
Delaney Snead

Chelsey A. Godfrey Scholarship

Emma Helfrich

Lois Cox and Edna Goodwin Scholarship

Carly Edwards

Ralph P. Hines '59 Scholarship

Jonathan Epperson

Charles S. Hughes Scholarship

John Chu
Emily Garbera

Williams A. Joyner Scholarship

Kase Poling

Dennis & Sherry Kamber Scholarship

Elliot Idio

Hersie B. & Ethel G. McCauley Scholarship

Genevieve Davis
Caroline Kersey

Andrew "Tripp" McDavid Memorial Scholarship

Brent Reynolds

Kenton & Liliana Meland Scholarship

William Hiatt

Newport News Shipbuilding Scholarship

Kevin Curse

John E. Pruitt, Jr. Scholarship

William Cole
Louis Hatcher

Richard Quarterman '04 Memorial Scholarship

Ahmed Ahmed

Howell & Ann Simmons Land Development Design Scholarship

Julia Cadman

Stantec Award for Excellence in Engineering

Margaret Wilcher

George A. Stewart Scholarship

Alison Beisner
Julia Cadman
Kevin Cruse
Philip Gotthelf
Melissa Joyce
Laura Nicaise
Victor O'Toole
Sophia Schenk
Zachary Shugart
Lucy Travers
Adrianna Weber

L.J. Turner & W.S. Dewhirst Scholarship

Mark Remmey
Austin Wydajewski

Vecellio Scholarship

Sydney Greenspan
Rebecca King
Danielle Lehman
Daniel Szalecki
Lucy Travers
Aleia Warren
Robert Witte

Virginia Concrete Scholarship

Kevin Kumordzie
Sayed Rohani
Darko Stanisic

Donald and Mary Wiebke Scholarship

Lucy Travers

Harry S. & Patsy B. Williams Scholarship

William Hiatt

Williams Industries Scholarship

Kevin Cruse
Ethan Obenrader

Verne & Jewel Williamson Scholarship

Miranda Tison

GRADUATE SCHOLARSHIPS AND FELLOWSHIPS

Ann N. and Thomas N. Hunnicutt, III
Fellowship
Bing Xu

AWWA Graduate Student Scholarship
Shiqiang Zou

Brian R. Bluhm Memorial Fellowship
Dylan Russell Honardoust
He Yang

Carl O. Sundberg Scholarship
Laura Nicaise

Davenport Leadership Scholar
Deborah McGlynn

Deloitte Foundation Data Analytics
Fellowship
Kaveh Bakhshkelarestaghi

DFI at Large Scholarship
Roger Knittle

DRRM Scholarship
Anmol Haque

Edna Bailey Sussman Fellowship
Matthew Ferby
Carlos Fernando Mantilla Pena
Katherine Santizo
Kory David Wait

Frederick "Fritz" Hoffman '13
Scholarship
Laura Nicaise

Freeman Fellowship
Nicholas Gentile

Fulbright Scholarship
Muhammad Ali
Julio Copana Paucara
Mohammad Yunus Naseri
Martin Scavone

GEM Associate Fellowship
Charlie Grinton
Dwayne Jefferson
Jalen Johnson
Daniel Keku
Kathryn Lopez

George A. Stewart Engineering
Scholarship
Laura Nicaise

ICTAS Fellow
Rebecca Kriss

John and Natalie Hawkins Memorial
Fellowship
Milad Abedi

Leifur Eiriksson Foundation Fellowship
Thomas Kennedy

Matthew G. Gwaltney Memorial
Fellowship
Laura Nicaise

Multicultural Academic Opportunities
Program (MAOP)
Charlie Grinton
Dwayne Jefferson
Jalen Johnson
Carlos Fernando Mantilla Pena
Jeannie Purchase
Marian Alicea

Myers-Lawson Doctoral Fellowship
Mayank Khurana

National Research Traineeship, Disaster
Resilience and Risk Management
Michael Lee

National Science Foundation Graduate
Research Fellowship
Abraham Cullom
Ayella Maile-Moskowitz
Hanniyah Majeed
Brooke Baugher

NCC (National Capital Chapter)
CMAA (Construction Management
Association of America) Scholarship
Sogand Mohammadhasanzadeh

New Horizon Graduate Scholar
Maria Amaya
Sergio Marlon Ballivan
Stefany Baron
Benjamin Cole Davis
Charlie Grinton
Joel Javier
Dwayne Jefferson
Jalen Johnson
Kathryn Lopez
Hanniyah Majeed
Cristopher Montalvo
Julie Paprocki
Jeannie Purchase
Sasha Redmon
Katherine Santizo

Pratt Graduate Fellowship
Reem Jaber
Trai Nguyen
Jin Pan
Zixuan Wang

Raymond G. and Madelyn A. Curry
Graduate Fellowship
Dennis Kiptoo
Matthew Roever
Mohsen Zaker Esteghamati

Terracon Fellowship
Manish Dulal
Hunter Ingram

US Air Force Academy Faculty Pipeline
Vincent Bongioanni

Vecellio Scholarship
Brooke Baugher

Virginia Water Resources Center
Student Competitive Grant Program
Sarah Busch

Walts Fellowship
Rebecca Kriss

WaterINTERface IGEP (Interdisciplinary
Graduate Education Program)
Fellowship
Akshay Jian

PH.D. DEGREES

The following doctoral degrees were awarded to CEE students between Summer II 2017 and Summer I 2018:

Name: [Seyyed Abtahi](#)
Dissertation Title: Implications of Shape Factors on Fate, Uptake and Nanotoxicity of Gold Nanomaterials
Advisor: **Peter Vikesland**

Name: [Thomas Adams](#)
Dissertation Title: The Use of Central Tendency Measures from an Operational Short Lead-time Hydrologic Ensemble Forecast System for Real-time Forecasts
Advisor: **Randy Dymond**

Name: [Ali Albatal](#)
Dissertation Title: Advancement of Using Portable Free Fall Penetrometers for Geotechnical Site Characterization of Energetic Sandy Nearshore Areas
Advisor: **Nina Stark**

Name: [Cagdas Bilici](#)
Dissertation Title: Development of a Sediment Sampling Free Fall Penetrometer Add-on Unit for Geotechnical Characterization of Seabed Surface Layers
Advisor: **Nina Stark**

Name: [Emily Garner](#)
Dissertation Title: Occurrence and Control of Microbial Contaminants of Emerging Concern through the Urban Water Cycle: Molecular Profiling of Opportunistic Pathogens and Antibiotic Resistance
Advisor: **Amy Pruden-Bagchi**

Name: [Edwin Gonzalez Montvalo](#)
Dissertation Title: Influence of Project-Level Characteristics and Factors on Innovation and Value Creation in US Highway Public-Private Partnership Projects
Advisor: **Michael Garvin**

Name: [Pan Ji](#)
Dissertation Title: Effect of Water Chemistry, Pipe Material, Temperature and Flow on the Building Plumbing Microbiome and Opportunistic Pathogen Occurrence
Advisor: **Amy Pruden-Bagchi**

Name: [Xiaojin Li](#)
Dissertation Title: Anammox-based Technologies for Sustainable Mainstream Wastewater Treatment: Process Development, Microbial Ecology and Mathematical Modeling
Advisor: **Jason He**

Name: [Yi Liu](#)
Dissertation Title: Investigation of the Spatiotemporal Evolution of Tropical Cyclone Storm Surge under Sea Level Rise
Advisor: **Jennifer Irish**

Name: [Shuai Luo](#)
Dissertation Title: Development of Integrated Photobioelectrochemical System (IPB): Processes, Modeling and Applications
Advisor: **Jason He**

Name: [Victory Odize](#)
Dissertation Title: Diffuser Fouling Mitigation, Wastewater Characteristics and Treatment Technology Impact on Aeration Efficiency
Advisor: **Adil Godrej**

Name: [Julia Roa Perez](#)
Dissertation Title: Development of Aircraft Wake Vortex Dynamic Separations Using Computer Modeling
Advisor: **Antonio Trani**

Name: [Katherine Phetxumphou](#)
Dissertation Title: Novel Approaches to Exposure Assessment and Dose Response to Contaminants in Drinking Water and Food
Advisor: **Daniel Gallagher**

Name: [Craig Powers](#)
Dissertation Title: Monitoring the Transport of Microorganisms in Aquatic Environments Using Unmanned Surface Vehicles
Advisor: **DG Schmale and Linsey Marr**

Name: [Mohan Qin](#)
Dissertation Title: Resource Recovery by Osmotic Bioelectrochemical Systems Towards Sustainable Wastewater Treatment
Advisor: **Jason He**

Name: [Siddhartha Roy](#)
Dissertation Title: Interplay of Water Chemistry and Entrained Particulates in Erosion Corrosion of Copper and Nonlead Alloys in Potable Water Systems
Advisor: **Marc Edwards**

Name: [Yasaman Shahtaheri](#)
Dissertation Title: A Probabilistic Decision Support System for a Performance-Based Design of Infrastructures
Advisor: **Jesus de la Garza and Madeleine Flint**

Name: [Duc Tran](#)
Dissertation Title: Experiments on the Transformation of Mud Floccs in Turbulent Suspensions
Advisor: **Kyle Strom**

Name: [Berk Uslu](#)
Dissertation Title: Development of Protocols and Methods for Predicting the Remaining Economic Life of Wastewater Pipe Infrastructure Assets
Advisor: **Sunil Sinha**

Name: [Yan Wang](#)
Dissertation Title: Tracking Disaster Dynamics for Urban Resilience: Human-Mobility and Semantic Perspectives
Advisor: **John Taylor and Michael Garvin**

Name: [Haoran Wei](#)
Dissertation Title: Surface-Enhanced Raman Spectroscopy for Environmental Analysis - Optimization and Quantitation
Advisor: **Peter Vikesland**

Name: [Marjorie Willner](#)
Dissertation Title: Environmental Analysis at the Nanoscale: From Sensor Development to Full Scale Data Processing
Advisor: **Peter Vikesland**

Name: [Heyang Yuan](#)
Dissertation Title: Bioelectrochemical Systems: Microbiology, Catalysts, Processes and Applications
Advisor: **Jason He**

FACULTY

VECELLIO CONSTRUCTION ENGINEERING AND MANAGEMENT

Jesus M. de la Garza, Vecellio Professor / Program Coordinator
Michael J. Garvin, Associate Professor
Farrokh Jazizadeh Karimi, Assistant Professor
Frederick Paige, Assistant Professor
Tripp Shealy, Assistant Professor
Sunil K. Sinha, Professor

ENVIRONMENTAL & WATER RESOURCES ENGINEERING

Andrea M. Dietrich, Professor
Randel L. Dymond, Professor
Marc A. Edwards, University Distinguished Professor
Daniel L. Gallagher, Professor
Adil N. Godrej, Research Associate Professor (OWML)
Stan Grant, Professor (OWML)
Zhen (Jason) He, Professor
Erich T. Hester, Associate Professor
Clay Hodges, Research Assistant Professor
Jennifer L. Irish, Professor
Gabriel Isaacman-VanWertz, Assistant Professor
William R. Knocke, Professor
John C. Little, Charles E. Via, Jr. Professor
Linsey C. Marr, Charles P. Lunsford Professor
Amy J. Pruden, W. Thomas Rice Professor
Megan Rippy, Assistant Professor (OWML)
Robert Paolo Scardina, Assistant Professor of Practice
Kyle Strom, Associate Professor
Peter J. Vikesland, Nick Prillaman Professor / Program Coordinator
Zhiwu (Drew) Wang, Assistant Professor (OWML)
Claire White, Assistant Professor of Practice
Mark A. Widdowson, Assistant Department Head and Professor
Kevin Young, Assistant Professor of Practice

GEOTECHNICAL ENGINEERING

Thomas L. Brandon, Professor
Joseph E. Dove, Associate Professor of Practice
George M. Filz, Charles E. Via, Jr. Professor
Russell A. Green, Professor
Matthew Mauldon, Associate Professor
Adrian Rodriguez-Marek, Professor/Program Coordinator
Nina Stark, Assistant Professor
Alba Yerro Colom, Assistant Professor

STRUCTURAL ENGINEERING AND MATERIALS

Finley A. Charney, Professor
W. Samuel Easterling, Department Head and Montague-Betts Professor of Structural Steel Design
Matthew R. Eatherton, Raymond G. and Madelyn Ann Curry Faculty Fellow in Structural Engineering
Madeleine M. Flint, Assistant Professor
Matthew H. Hebdon, Assistant Professor
Eric Jacques, Assistant Professor
Ioannis Koutromanos, Associate Professor
Robert T. Leon, David H. Burrows Professor/Program Coordinator
Carin L. Roberts-Wollmann, Professor
Rodrigo Sarlo, Assistant Professor
Maryam Shakiba, Assistant Professor

TRANSPORTATION INFRASTRUCTURE AND SYSTEMS ENGINEERING

Montasir Abbas, Professor
Alexander S. Brand, Assistant Professor
Gerardo W. Flintsch, Professor
Kathleen L. Hancock, Associate Professor
Kevin P. Heaslip, Associate Professor / Program Coordinator
Susan Hotle, Assistant Professor
Bryan J. Katz, Associate Professor of Practice
Hesham A. Rakha, Samuel Reynolds Pritchard Professor of Engineering
Antonio A. Trani, Professor
Linbing Wang, Professor

EMERITUS FACULTY

Gregory D. Boardman, EWR
Thomas E. Cousins, SEM
William E. Cox, EWR
Donald R. Drew, TISE
J. Michael Duncan, GEOT
Antoine G. Hobeika, TISE
Robert C. Hoehn, EWR
Siegfried M. Holzer, SEM
J. Martin Hughes, EWR
David F. Kibler, EWR
Thangavelu Kuppusamy, GEOT
James K. Mitchell, GEOT
Thomas M. Murray, SEM
John T. Novak, EWR
Raymond H. Plaut, SEM
Clifford W. Randall, EWR
Kamal B. Rojiani, SEM
Dusan Teodorovic, TISE
Michael C. Vorster, CEM
Richard E. Weyers, SEM

FACULTY HONORS AND ACHIEVEMENTS

Stark earns two national honors in 2018

Nina Stark was awarded a National Science Foundation Faculty Early Career Development (CAREER) award to study soil mechanics in response to hydrodynamic forcing and morphodynamics. Her goals through this research are to measure and assess strength and pore pressure in response to nearshore and coastal sediments under forcing, while

also educating students in a multi-disciplinary manner in coastal processes and soil mechanics through the integration of an undergraduate field research program. She hopes this will also raise awareness and educate the public about sea level rise and climate change related increase of inundation events.

Stark was also selected by the Office of Naval Research for its 2018 Young

Investigator Program to further her research into geotechnical soil characterizations from remote sensing for the assessment of coastline strength, stability, and trafficability. The award supports laboratory equipment, graduate student stipends and scholarships, and other expenses critical to ongoing and planned investigational studies.



Montasir Abbas

- College of Engineering Dean's Award for Excellence in Service
- Promoted to Professor



Randy Dymond

- Promoted to Professor



Matt Eatherton

- Appointed the Raymond G. and Madelyn Ann Curry Faculty Fellow in Structural Engineering



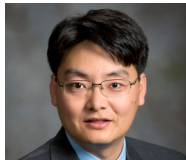
Gerardo Flintsch

- College of Engineering Dean's Award for Excellence in Research



Russell Green

- CEE Alumni Teaching Excellence Award



Jason He

- Named Associate Editor for the Science of the Total Environment, the Journal of Environmental Engineering, and Water Environment Research
- Member of the Editorial Board for Chemical Engineering Journal
- Water L. Huber Civil Engineering Research Prize by ASCE



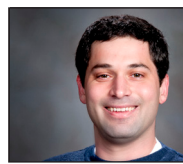
Jennifer Irish

- Fulbright Fellowship in Haifa, Israel



Bryan Katz

- Excellence in Transportation Engineering Education Award by the Institute of Transportation Engineers
- Promoted to Associate Professor of Practice



Ioannis Koutromanos

- Promoted to Associate Professor with tenure



Roberto Leon

- Reappointed the David H. Burrows Professor of Construction Engineering



John Little

- Reappointed the Charles E. Via, Jr. Professor of Civil and Environmental Engineering



Linsey Marr

- Appointed the Charles P. Lunsford Professor



Paolo Scardina

- Academic Integrity and Excellence Award



Kyle Strom

- G.V. Loganathan Award



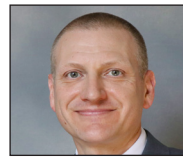
Peter Vikesland

- Appointed the Nick Prillaman Professor
- 2018 Walter J. Weber, Jr. AEESO Frontier in Research Award



Carin Roberts-Wollman

- Delmar L. Bloem Distinguished Service Award



Kevin Young

- Certificate of Teaching Excellence in the College of Engineering

MEET THE NEW FACULTY



Alex Brand / TRANSPORTATION INFRASTRUCTURE AND SYSTEMS ENGINEERING

Alex S. Brand earned three degrees in civil engineering from the University of Illinois at Urbana-Champaign. His research interests include materials science of cementitious materials with particular interest in advanced characterization techniques to interrogate the nature of bonding, microstructure development, and reaction and hydration kinetics. He studies concrete sustainability through using recycled and by-product aggregates and looks at the materials design and analysis for two-lift concrete paving, roller-compacted concrete, fiber-reinforced concrete, and concrete with high volumes of recycled materials. He was a postdoctoral research associate at the National Institute of Standards and Technology (NIST) where he developed an unprecedented digital holographic microscopy technique to monitor real-time evolution of surface topography with nanoscale vertical precision to quantify rate kinetics.



Stan Grant / ENVIRONMENTAL AND WATER RESOURCES

Stan Grant is joining as a Professor in the Occoquan Watershed Monitoring Laboratory. He comes to Virginia Tech from his position as a Professor of civil and environmental engineering in the Henry Samueli School of Engineering at the University of California, Irvine. Grant earned his B.S. from Stanford University in Geology, as well as an M.S. and Ph.D. in Environmental Engineering Science from Caltech in Pasadena, California. His research interests focus on human and ecosystem water security, coastal and drinking water quality, environmental fate and transport modeling. He has given many invited lectures, received academic and non-academic awards and honors, and also has extensive environmental consulting experience..



Megan Rippey / ENVIRONMENTAL AND WATER RESOURCES

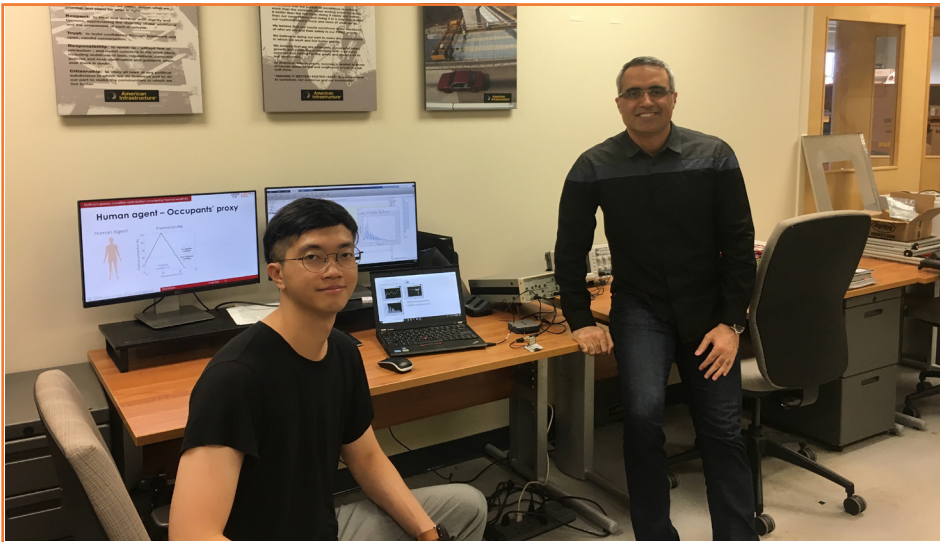
Megan A. Rippey is joining as an Assistant Professor. She previously served as an Assistant Project Scientist in civil and environmental engineering at the University of California Irvine. She earned her B.S. from the University of California Santa Cruz in Marine Biology. She also earned an M.S. from the University of California San Diego in Marine Biology and a Ph.D. in Biological Oceanography. Her research interests include coastal, estuarine, and riverine water quality and fate and transport modeling of contaminants including pathogens, fecal indicators, and micropollutants. She is interested in both natural and engineered systems, with an emphasis on sustainable, green engineering designs with a biological component. She has 17 publications and submitted manuscripts and has given 17 invited presentations.



Rodrigo Sarlo / STRUCTURAL ENGINEERING AND MATERIALS

Rodrigo Sarlo is joining as an Assistant Professor after earning his B.S. in mechanical engineering from the University of Virginia and an M.S. and Ph.D. in Mechanical Engineering from Virginia Tech. His research interests include resilient infrastructure and smart cities, instrumentation and sensing, machine learning internet of things, vibrations and dynamics, and modal analysis. He worked in the Virginia Tech Smart Infrastructure Laboratory doing automated smart infrastructure monitoring. In this role, he performed system identification of a multi-story smart building using a network of 225 accelerometers relying only on ambient excitation such as wind and human activity. He also conducted research in human-structure interaction in violin acoustics in the VT Vibration and Adaptive Structures and Testing Lab, and multi-functional Biomaterials research in the Biomolecular Materials and Systems lab.

CONSTRUCTION ENGINEERING AND MANAGEMENT



Assistant Professor Farrokh Jazizadeh and Ph.D. student Wooyoung Jung in the lab.

The prominence and visibility of the Vecellio Construction Engineering and Management Program (VCEMP) continues to expand. The 2018 Vecellio Distinguished Lecture will be presented by Wayne A. Crew, P.E., the General Secretary of the National Academy of Construction. Seven undergraduate Vecellio Scholarships and one Graduate Vecellio Fellowship were awarded to highly-qualified students who have demonstrated leadership potential and an interest in pursuing a career in the construction industry. These students who were formally recognized during the proceedings of the Vecellio Distinguished Lecture are: Sydney Greenspan, Rebecca King, Danielle Lehman, Daniel Szalecki, Lucy Travers, Aleia Warren, Robert Witte, and Brooke Baugher.

Additional VCEMP highlights during this year included:

- The recognition of Noah Jolley, Director of Project Management at ACS Infrastructure Development, as Outstanding VCEMP Alumnus.
- The recognition of Robbie Williams, VDOT's Salem District Construction Engineer, as Outstanding VCEMP Alumnus.
- The recognition of Brooke Baugher as Outstanding VCEMP MS student and Diana M. Franco-Duran as Outstanding VCEMP Ph.D. student.
- The awarding of a Construction Management Association of America Scholarships to Sogand Hasanzadeh and Diana M. Franco-Duran from CMAA's National Capital Chapter.

Jesus M. de la Garza, the Vecellio Professor of Construction Engineering and Management, finished 30 amazing and fulfilling years of service at Virginia Tech. From now on, he will receive free parking! He chaired the Research Working Group within the Intelligent Infrastructure for Human Centered Communities' Destination [for talent] Area. He continued his role as the Academic Advisor to the Construction Industry Institute's Manufacturing and Life Sciences Sector. de la Garza is now on his eighth year as Editor-in-Chief for ASCE's Journal of Construction Engineering and Management and also serves on ASCE Construction Institute's Awards Committee.

Michael J. Garvin took a research leave in the fall semester. He collaborated with professors Ray Levitt and Dick Scott of Stanford University to secure a contract with Edward Elgar Publishers to publish a book about public-private partnerships (PPPs) in 2019. Additionally, he submitted five journal papers; two were accepted and three are under revision. He also spoke about PPPs by invitation at Cornell University and the University of Limerick in Ireland. Mike returned in the spring semester to his normal duties. He continues to provide advisory services to the Build America Initiative for the Federal Highway Administration.

Farrokh Jazizadeh's research is at the intersection of civil infrastructure management and data science on adaptive environments, human-centered communities, and infrastructure operational analytics. He has been active with multiple projects on human thermal demand assessment for adaptive buildings, artificial-intelligence control algorithms for building systems, urban scale energy management as well as participatory sensing for sustainable urban mobility. He has received funding from National Science Foundation, VT ICTAS, VT BioBuild, SAE International, and the Association of American Railroads. He has authored multiple journal publications and actively involved in different conferences including ASCE International Workshop on Computing in Civil Engineering (IWCCE), ASCE Construction Research Congress, and

ACM BuildSys and eEnergy.

Freddy Paige had an eventful year becoming the Assistant Director of the Virginia Center for Housing Research (VCHR). In his new role, Paige collaborated on a project with Housing and Urban Development (HUD) to update strategies for federal agencies to improve housing innovation. A stakeholders meeting with over 50 representatives from across the housing industry provided HUD with critical insights into the current state of the housing industry. His HUD project ended with a group meeting with Secretary Ben Carson, and opportunities for the VCHR to continue their state and national contribution to improving the affordability, sustainability, and quality of housing. Paige also was awarded an ICTAS REU Site grant where he mentored eight undergraduate student researchers, enhancing their research skills and understanding of research opportunities post-graduation. The newly formed STILE research group has presented their work at the Construction Research Congress, Residential Building Design and Construction Conference, and ASHRAE

Winter Conference.

Tripp Shealy was awarded the G.V. Loganathan Teaching Award in 2017. This award is given to one faculty member a year and is awarded by students in the department. Dr. Shealy also developed a new course titled, Human Behavior and Infrastructure Systems, where students learn to apply behavioral science to enhance their engineering designs. He also published multiple case-studies teaching how concepts from behavioral science can improve engineering decision-making that involves risk and uncertainty. The modules follow a Harvard Business School format where students are given a real-world case and devise a solution before learning how the professional team solved the problem. Dr. Shealy continued his work on two NSF sponsored projects studying decision biases during the construction process and investigating students' beliefs about climate change.

Sunil Sinha had a very productive year in teaching, research, scholarship, and service. He taught the graduate course "Information

Technology for Infrastructure" in Fall 2017 and "Infrastructure Asset Management" in the Spring Semester 2018. Sunil Sinha leads efforts to develop national water pipeline database. The U.S. Bureau of Reclamation has funded a five-year study, led by Virginia Tech. The researchers will collect high-quality field performance data on reliability for water pipelines of different materials, including cast iron, ductile iron, reinforced concrete, steel, lead, plastic, thermoplastic, and others. This study will include analyses of the economics, cost-effectiveness, and life-cycle costs associated with the various water pipe materials under evaluation. Sinha will work to develop a national database, named PIPEiD, otherwise known as Pipeline Infrastructure Database that will be capable of efficiently and securely storing the collected data. Sinha serves as vice-chair of NIST Community Resilience Standing Committee for water and wastewater and he is chair of ASCE Asset Management Division.

The 2018 Vecellio Distinguished Lecture to be presented by Wayne A. Crew, P.E., General Secretary of the National Academy of Construction.

Prior to his current position, he was the director of the Construction Industry Institute (CII), the renowned research institute based at The University of Texas at Austin. He has over 45 years of experience in the engineering and construction industry, and has worked for both owner and contractor firms as well as in research. Early in his career, he served in project management and engineering positions for two large owner companies, Amoco Chemical Corporation and Michigan Chemical Corporation. Later he served in executive positions at engineering and construction giants Technip USA and KBR. His roles in research included serving as director of research at CII and then as director of CII. He holds a bachelor's degree in civil engineering from Michigan State University and an MBA from the University of Houston. He is active in the ACE Mentor Program, serving on both the group's national board of directors and the Austin, TX, board of directors. He also has served in many capacities in his church and with the Boy Scouts of America. Wayne has a keen interest in improving the engineering and construction industry through development and implementation of best practices. Working with Virginia Tech faculty in the aftermath of the tragic 2007 campus shooting there, he created a graduate best practices class taught by industry lecturers and practitioners. That course is now offered to the industry at large through CII. Wayne has been married to Rivanna for over 40 years. They have two children and two grandchildren. He is a recreational bike rider, twice completing the Register's Annual Great Bicycle Ride Across Iowa (RAGBRAI) the world's largest bike-touring event. He and Rivanna enjoy playing with the grandkids and an occasional round of golf. During the 2018 Vecellio Lecture, he will speak about the research based best practices of Zero Safety Incidents and Front End Planning. The Zero Safety Incident discussion included a specific look at the need for enhanced efforts to prevent low frequency but high impact events (fatalities) in capital projects.



Jesus M. de la Garza, who just completed 30 years of service at Virginia Tech, has been involved with TCMI for 30 years as an instructor and as a co-director since 2010.



de la Garza contributes to 30 years of management development

The Transportation Construction Management Institute (TCMI) just celebrated its 30-year anniversary.

TCMI was designed as an intensive, full-time development program for middle and upper level personnel in management positions. The workload is high and attendees are expected to give their total commitment to the program.

The institute grew out of a number of discussions between representatives of Virginia Tech, the Virginia Department of Transportation (VDOT), and the Virginia Transportation Construction Alliance (VTCA).

TCMI was the creation of **Michael C. Vorster**, the David Burrows Professor Emeritus, and **Richard F. Harshberger**. Both saw a need to provide a management development program tailored to the needs of transportation construction professionals to help them meet the demands of the Commonwealth's new initiatives in transportation.

TCMI is designed for 30 individuals, 15 coming from VDOT

and 15 representing VTCA. Vorster and Harshberger led the effort until Vorster's retirement in 2010.

Jesus M. de la Garza, the Vecellio Professor of Construction Engineering and Management, who coincidentally also just completed 30 years of service at Virginia Tech, has been involved with TCMI for those 30 years as an instructor and as a co-director since 2010.

More than 900 graduates have gone through the program and have contributed to the better interests of all Virginians. By working together, these TCMI alumni have completed projects in a more cost-effective and competitive manner, applied newly acquired management and interpersonal skills to areas of increased responsibility and authority, and have adopted a positive team approach with their counterparts in the industry.

A powerful and highly beneficial by-product of the TCMI Outreach initiative has been the creation of CHAMPS (Center for Highway Asset Management Programs).

In the late 1990s, one of the VDOT delegates asked de la Garza if he was staying for dinner because he wanted to discuss an idea and wanted to hear de la Garza's input. The discussion about VDOT's newly implemented performance-based highway maintenance contracting strategy led to the creation of a multi-year and multimillion dollar research activity, housed within CHAMPS. CHAMPS has produced doctoral and masters students, research experiences for undergraduates, and scholarly publications.

TCMI, which was originally founded for outreach, has led to numerous research and scholarship opportunities.

"There have been many connections to research that have been afforded by the networking that TCMI has enabled," noted de la Garza.

VDOT's and VTCA's leadership has been instrumental in funding TCMI for the last 30 years and brings significant value to the way in which the highway infrastructure is procured, designed, built, and maintained.

ENVIRONMENTAL AND WATER RESOURCES

The Environmental and Water Resources (EWR) Program continues to be one of the most respected graduate programs in environmental engineering in the U.S., according to the rankings published annually by U.S. News and World Report. In 2018 the EWR Program moved up to a tie for #6 among graduate U.S. programs. Continuing to rank among the best graduate environmental engineering programs reflects the dedicated work of the EWR faculty, staff and students.

The EWR program continues to receive exemplary service and support from our staff members who are located in both Blacksburg and Northern Virginia. We are likewise blessed to have had staff members who have provided dedicated service in the program for many, many years. Julie Petruska retired from the program at the end of spring semester, having provided superb service to Virginia Tech as a whole for 40 years and 33 years of dedicated work in overseeing our EWR laboratories and research efforts here on campus. Julie's career with us touched the lives and research work of probably 800 to 1000 students in EWR over her many years with us. Many of our program's alumni have acknowledged Julie's fine help in the Acknowledgement section of their thesis or dissertation. We wish Julie all the best in retirement! A.J. Prussin has been hired to assume Julie's leadership role in the EWR program. Welcome aboard to A.J.!

Beth Lucas continues her excellent work as the primary administrative support person to the EWR program's faculty and students. Likewise, Debbie Cooper provides very useful administrative support to several EWR faculty members who are located in Patton Hall. Jody Smiley continues to provide high-quality guidance to through research work of our

program, focusing on the more advanced analytical needs of our faculty and students. Congratulations go to Jody as she has reached her 20-year anniversary with the program!

Fifteen EWR staff and faculty, four masters and five PhD students, are at the Occoquan Laboratory, located in Manassas, Virginia, and established in 1972. The lab is dedicated entirely to sponsored research in all areas of water quality. The commercially-accredited environmental laboratory staff is led by Dongmei Alvi, with staffers Joan Wirt, Curt Eskridge, Alex Clare, and Kyle Grizzard. The field operations are led by Harry Post, ably assisted by Doug Holladay and Mark Lucas. Barbara Angelotti, and her staff of Alicia Tingen and Marilyn Stull, are responsible for office operations and much more, while Jeanie Taylor is the building custodian. Faculty members "Zhiwu" Drew Wang and Adil Godrej will soon be joined by Stanley Grant and Megan Rippy, both coming to us from the University of California at Irvine. Field staffer George "Woody" Underwood retired after nearly 39 years, and was one of the winners of the 2018 Staff Career Achievement Awards. On May 4, 2018, the Lab hosted the first Thomas J. Grizzard, Jr., research symposium in memory of the former long-time director's career. The Symposium was sponsored by Fairfax Water, Fairfax County Department of Public Works and Environmental Services, the Upper Occoquan Service Authority, and Virginia Tech's Charles E. Via, Jr., Department of Civil and Environmental Engineering.

The following paragraphs provide information on the ongoing activities and recent accomplishments of the many faculty members who are part of the EWR Program.

With researchers in Spain, **Andrea M. Dietrich** published novel research improving desalinated drinking water quality for consumers. She traveled extensively in China lecturing at three universities and enjoying colleagues, history, and food. In Virginia, she collaborated with faculty, students, citizens, agencies, and businesses on the first comprehensive investigation of Dan River water quality since the 39,000 tons coal ash spill. Her research group advanced the understanding of how aerosolized contaminated water leads to potential adverse health effects when inhaled by humans. This year Dr. Dietrich celebrated 30 years of teaching, research, and outreach at Virginia Tech and was rewarded free parking... it was worth the wait!

Randy Dymond teaches and performs research in the areas of urban stormwater and land development. He has active stormwater research projects with Blacksburg, Roanoke, NSF, and Fairfax County. During the past year, Randy graduated eight MS students and one PhD, has had three conference and six journal papers published, with one more accepted for publication and another 11 papers under review. He was honored to become a Fellow of ASCE and a Diplomat of American Academy of Water Resources Engineers. In addition, the Land Development Design Initiative (LDDI) continues to grow with 45 sponsoring companies last year; more information is available at www.lddi.cee.vt.edu.

Marc Edwards won numerous honors in 2018 including the Scientific Freedom and Responsibility award from the American Association for the Advancement of Science (AAAS), Visionary of the Year from the League of Wisconsin Voters, and an honorary PhD from Clarkson University. As Principle Investigator in collaboration with Dr. Kelsey Pieper, Louisiana State University (LSU), North Carolina State University (NCSU), Edwards won a three year grant for \$2 million dollars from the Environmental Protection Agency to improve consumer responses to lead in drinking water. With **Amy Pruden**, Edwards continued to lead research into infrastructure inequality nationally, emphasizing assistance on consumers



Professors Andrea Dietrich and Daniel Gallagher celebrating a successful research and graduations with students.

water quality problems, in cities and towns that are struggling financially.

Dan Gallagher actively pursued interdisciplinary risk-related research for water and food safety. He, with colleagues at 18 other institutions, are preventing pathogenic *E. coli* contamination through a \$25 million USDA grant. He serves on the Executive Management Team, which received the Mission Integration of Research, Education, and Extension Award by the National Institute of Food and Agriculture. He traveled in China to present on statistical and data analysis for water utilities. Together with colleagues in CEE and CSES, he conducted research and outreach to water utilities in Virginia. He and students presented at the Society for Risk Analysis, the International Association for Food Protection, the American Water Resources Association, and the American Water Works Association conferences.

Adil Godrej's research during the last year was a continuation of that in previous years. During the last few months, fairly major changes were negotiated in the long-term monitoring program on the Potomac River, and these will be implemented in 2019. Godrej is

looking forward to the arrival of new research partners with the addition of two new faculty, one of whom will be the new Associate Director of the Occoquan Lab. Godrej has recently finished his first year as Director.

Zhen (Jason) He has had a productive year with publishing 30 journal papers and graduating four PhD and seven MS students. He delivered invited seminars at Northwestern University, Clemson University, and University of Toronto. He was selected to receive a 2018 Walter L. Huber Civil Engineering Research Prize by ASCE. He was recognized as an Outstanding Reviewer for the second time by Environmental Science: Water Research & Technology and also joined its Advisory Board. He became an Associate Editor for Science of the Total Environment and Journal of Environmental Engineering, and a member of Editorial Board of Chemical Engineering Journal.

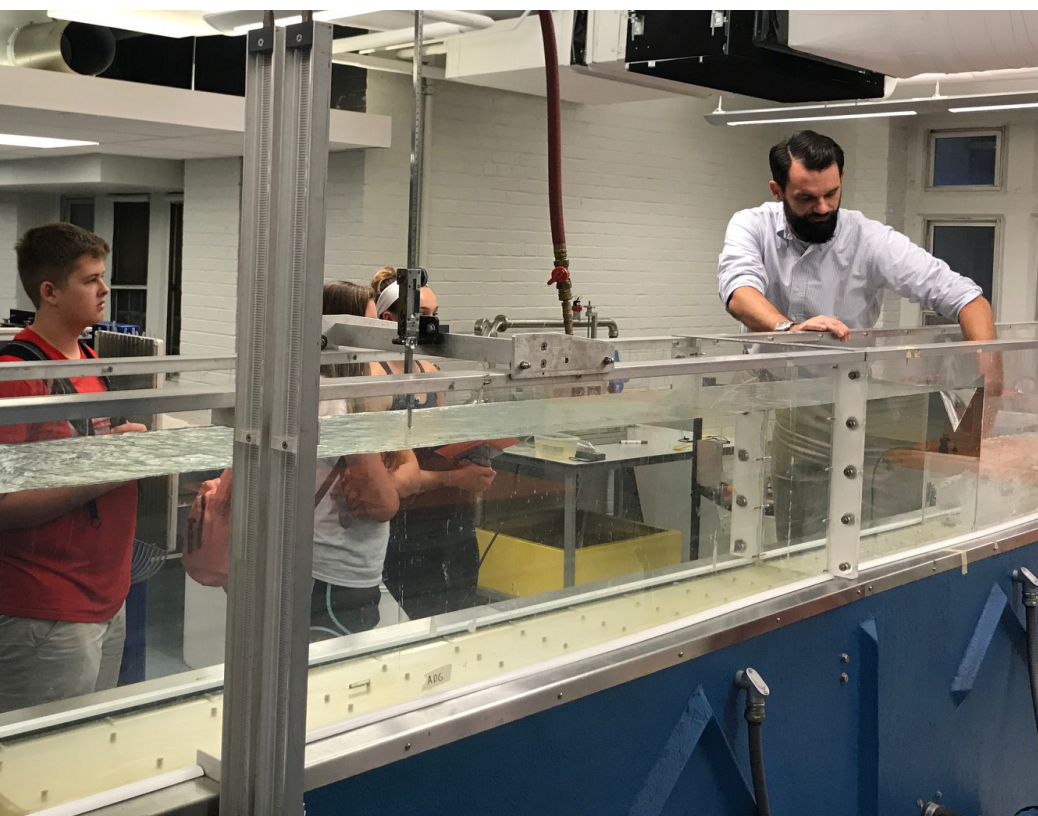
Erich Hester's research focuses on how human actions in watersheds interact with stream, river, and wetland hydraulics to affect aquatic ecological health and water quality. A core research theme is the effect of stream restoration and river management practices

on water quality. He was on sabbatical this year supported by a Fulbright Scholarship to research the effect of floodplain restoration on water quality in Taiwan. He also continued to lead projects supported by the National Science Foundation and the Office of Surface Mines to study preferential flow and natural attenuation of contaminants in riverbeds, riverbanks, and mining areas. He serves as associate editor for Water Resources Research, and on the Board of Directors of the Consortium of Universities for Advancement of Hydrologic Science (CUAHSI).

Clayton Hodges continues his work to understand and mitigate the impacts of urban stormwater runoff to help protect and restore our streams and rivers. During the past year, Dr. Hodges' research has been focused on understanding the deficiencies in construction and maintenance of green stormwater infrastructure, aiding in the development of erosion risk mapping procedures, and in developing tools for municipalities to more effectively catalogue and track maintenance issues for stormwater best management practices.

Jennifer L. Irish continued coastal hazards research, focusing on the physics of and risk posed by coastal floods and measures to manage these risks. Irish authored seven journal papers on topics including probabilistic surge hazard assessment. Irish serves on the National Academies committee on long-term coastal change, ASCE's Committee on Technical Advancement, and ASCE's Coastal Engineering Research Council. She is co-organizer of the 2018 VASEM Summit on Securing Prosperity in the Coastal Zone. She continues to serve on the editorial boards of Coastal Engineering and the Journal of Waterway, Port, Coastal, and Ocean Engineering-ASCE.

Gabriel Isaacman-VanWertz has been developing new tools and techniques to analyze the composition to study of organic gases and particles and understand their roles in the formation of air pollution. His NOAA- and DOE-supported work will expand the impact of atmospheric research and for the first time allow atmospheric monitoring sites to easily measure the composition of particulate matter. His collaboration with **Mark Widdowson** studying vapors from underground home



Assistant Professor of Practice Paolo Scardina does a demonstration in the water lab in Patton Hall.

heating oil spills has yielded important results about the impacts of spills. His publications in top journals have provided new insights into fundamental atmospheric chemistry, as well as shifts in understanding of pollution in major cities like Los Angeles.

Bill Knocke completed his 40th year as a member of the EWR program during 2018. He is currently the longest-term faculty member in the CEE Department in terms of continuous years of service at VT. Dr. Knocke stepped down as EWR Program Coordinator in August after five years of service in this administrative leadership role in the program. He continues as the faculty advisor to all CEE distance learning students who are enrolled in MS degree programs. He also continues to lead the Program Development Institute program for VT which is a cohort training program for 30-40 new VT faculty members each year as they seek to initiate the research and scholarly programs on campus. His main research area is still related to iron and manganese control in drinking water treatment. During the year Dr. Knocke presented two research papers on manganese control at technical conferences. He

continues to work to translate the research on manganese control done at Virginia Tech into new design practices for the water industry.

John Little continues to focus on developing a system-of-systems approach to sustainability and resilience. In this regard, he was invited to serve as a member of the stakeholder committee for the Global Systems Science (GSS) Destination Area, and received funding to develop a Concept Area on Systems Integration within GSS. John used this funding to host a workshop on Systems Integration for Global Systems Science with leading experts in the areas of integrated assessment and modeling (Tony Jakeman) and systems science (Sondoss Elsawah) invited to help lead the workshop. Tony Jakeman is the Honorary Editor in Chief of Environmental Modelling and Software (EMS), which is generally considered to be the top journal on computational frameworks and integrated assessment, and Founding Editor in Chief of a new journal on Socio-Environmental Systems Modeling (SESMO), which focuses on integrating models of social systems with those of ecological systems. John was invited to serve on the Editorial Board of SESMO.

Linsey Marr spent the past year on sabbatical as a Fulbright Scholar in Taipei. As a visiting researcher in the College of Public Health at National Taiwan University, she modeled the potential for long-distance transport of the flu virus through the atmosphere from mainland China to Taiwan. She gave seminars at the University of Hong Kong, National Taiwan University, and National Yang Ming University and attended two conferences in Taiwan. Over the summer, she spoke at the Gordon Research Conference on Microbiology of the Built Environment in Maine and gave a plenary talk at the Indoor Air Conference in Philadelphia.

Amy Pruden is busy with **Peter Vikesland** continuing to send students abroad and foster international collaboration towards tackling the spread of antimicrobial resistance through their National Science Foundation Partnership in International Research and Education (PIRE) project. She also continued her work tracking antibiotic resistance from farm to fork with her USDA team and is working with collaborators in Computer Science to develop bioinformatic tools for environmental monitoring of antibiotic resistance. Her collaboration with **Marc Edwards** continues, working towards identifying plumbing designs and strategies that employ knowledge of the microbiome to prevent the colonization of pathogens, while also bringing these tools to underserved communities on well water and to aid in disaster response, including a student trip to Puerto Rico to study recovery of water systems from Hurricane Maria.

Paolo Scardina had another productive year of instructing civil engineering undergraduates. Paolo was the recipient of the Academic Integrity and Excellence Award offered by the VT Office of Undergraduate Academic Integrity (i.e. Honor System). Paolo manages the civil engineering hydraulics teaching laboratory, which is used extensively with approximately 200 students each semester cycling through this instructional laboratory. Paolo also continues to advise the VT Chapter of ASCE and offers support to the competition teams Steel Bridge and Concrete Canoe.

Kyle Strom leads the Fluid and Sediment Dynamics research group, which focuses on landscape dynamics and improving our understanding and ability to model the movement of water and sediment in rivers, estuaries, and the ocean. Much of their work is carried out in the Baker Environmental Hydraulics Laboratory. The group started a new project this year which aims at improving predictions of ancient ocean current speed from mud deposits. Other topics the lab was engaged in include: the development of new laboratory and field equipment, the trapping of waterborne muddy sediment within riverbeds, the transfer of momentum between fluid vortices and sediment, the interaction of submarine flows and deposits, and the movement of mud in the Chesapeake Bay. Over the past year, Kyle and his colleagues have published journal papers and given talks on these topics. Kyle taught graduate courses in sediment transport, fluid mechanics, and open channel flow this past year and served as an associate editor of the Journal of Hydraulic Engineering.

Peter Vikesland returned from a six month sabbatical at ETH Zurich in early January and in the intervening months has settled back into teaching his course Fundamentals of Public Health Engineering and directing his research group. Over the past year, he has had three PhD students and one MS student complete their graduate studies. Working with **Linsey Marr** and her students, he initiated research to investigate the interesting properties of aerosolized water droplets and he continues working with **Amy Pruden** to develop sustainable approaches to mitigate the spread of antibiotic resistance. He serves as the Editor-in-Chief of the journal Environmental Science: Nano and is the current EWR Program Coordinator.

Zhiwu (Drew) Wang's group has published five journal papers, graduated one MS students, and recruited the first black student of the Occoquan Lab during the past year. He started multiple new projects on the research of aerobic granulation, anammox granules, enhanced phosphorus removal, biofiltration modeling, and thermal hydrolysis pretreatment in collaboration with five municipal utilities. His joint-effort with researchers in the Department of Food Science & Technology as well as the



Assistant Professor of Practice Kevin Young received a Certificate of Teaching Excellence.

George Washington University was supported by a new USDA grant for enabling high-rate production of value-added bioproducts from food wastes by using novel pure-culture biogranulation technique. His pioneer research harnessing fungi for stormwater and animal manure treatment was also funded by Virginia Agricultural Council and Virginia 4VA. He also developed and delivered the first EWR asynchronized online undergraduate course CEE 3104 Introduction to Environmental Engineering, along with the other two synchronized online courses he taught in the past year.

Claire White continues to have a diverse teaching schedule, splitting time between CEE and Virginia Tech's Program in Real Estate. During the past academic year, Claire taught three sections of CEE 2824 – Civil Engineering Drawings and CAD, two sections of CEE 3274 – Intro. to Land Development, one section of CEE 4804 - Professional and Legal Issues, and two sections of REAL 3024 – Applied Real Estate Development. She also served as a CEE undergraduate advisor. Additionally, in conjunction with Dewberry, Claire developed

a new textbook as part of the Land Development Handbook series, scheduled for publication in 2019.

Mark Widdowson teamed with **Gabriel Issacman-VanWertz** on an extensive study of vapor intrusion risks and impacts to domestic well water quality due to petroleum spills in Virginia. Their findings will serve as a basis for the formulation of policy by the Virginia Department of Environmental Quality. Widdowson continued his involvement with the Hampton Roads

Sanitation District's Sustainable Water Initiative for Tomorrow (SWIFT) project. He served on two working groups of the Interstate Technology and Regulatory Council; one on the emerging contaminant group of compounds known as PFAS and one on risk evaluation at petroleum-contaminated sites. Widdowson continues his administrative role as Assistant Department Head and Graduate Chair.

Kevin Young continues to maintain a busy teaching schedule, while also serving as Assistant Coordinator of the Land Development Design Initiative (lddi.cee.vt.edu) and advising the Sustainable Land Development Club (SLDC). During the past academic year, Kevin taught two sections of CEE 2814 – Civil & Environmental Engineering Measurements, two sections of CEE 3274 – Intro. To Land Development Design, and one section of CEE 4274 – Land Development Design.

環境與職業衛生的趨勢與展望

Influenza Virus Survival and Dynamics in the Atmosphere

專家演講

講者：Dr. Linsey C. Marr

時間：2018/02/27(二)

10:10-12:00 A.M.

地點：醫學二館 221教室

環境與職業衛生研究所敬邀



Marr bridges engineering and public health

Air pollution is responsible for seven million premature deaths per year. **Linsey Marr**, professor of environmental and water resources engineering, is looking to change that trend.

Her research focuses on emissions, transformation, fate, and effects of air pollutants such as ozone and airborne particles to provide the scientific basis for improving air quality and health. Marr is also addressing concerns about engineered nanomaterials in the atmosphere.

So what are nanoparticles? Nanoparticles are materials smaller than 100 nanometers (about 1000 times smaller than the width of a human hair), and nanotechnology is the application of these materials for the development of new products such

as drug delivery devices, thin solar cells, and sensors for environmental toxins.

These nanoparticles can be released into the air during manufacturing, use, or disposal of products and can be transported vast distances in the atmosphere. However, the health and environmental impacts of engineered nanomaterials are still somewhat unknown and inhalation exposure can be concerning.

Marr hopes to find out more about the release, transformation, fate, and toxicity of nanomaterials in the atmosphere. One challenge is finding a way to study the behavior of nanomaterials under realistic conditions in the environment, in terms of the chemical composition of air, water, and soil.

Marr's research also dives into

the airborne transmission of infectious disease such as the flu because the virus that causes it behaves like nanoparticles in air. Her interest in this topic grew out of frustration with the high frequency that her young children were catching infectious diseases from their peers at daycare.

The same tools and concepts she used to study engineered nanomaterials in the atmosphere also apply to viruses.

Marr has been especially interested in the seasonality of the flu, why it happens during the wintertime. She has studied it in a lab and in a daycare setting.

Initial results showed that the flu virus survived best when the relative humidity was either close to 100 percent, like when it's rainy outside, or below 50 percent, like when we

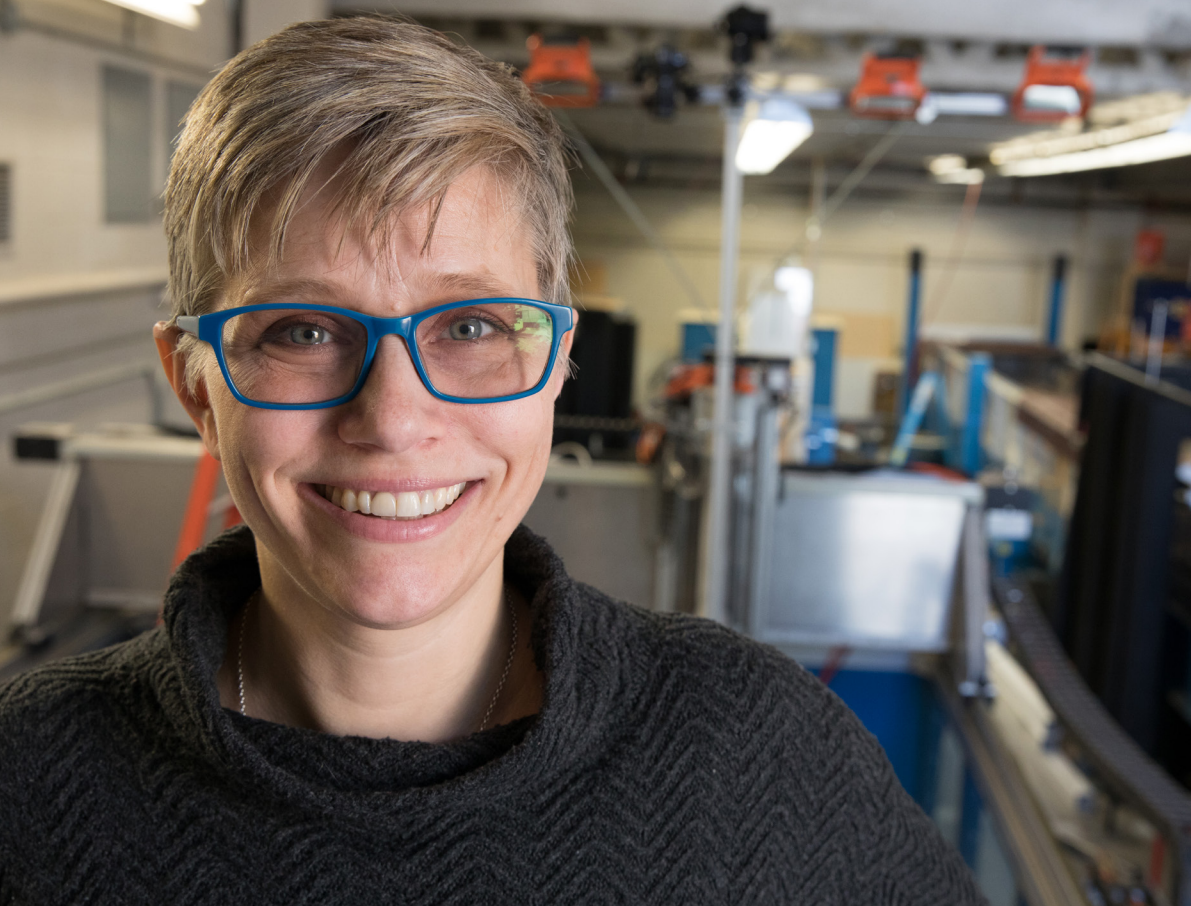
heat indoor air in the wintertime, but results in more realistic droplets show that the virus survives well across a wide range of humidities.

She is looking into different ways that humidity the flu virus, and the story is continuing to unfold.

Marr spent the last year in Taiwan on a Fulbright fellowship to examine whether the flu can be transmitted through the atmosphere over distances of hundreds of kilometers or more.

She worked with colleagues from National Taiwan University to estimate the amount of flu virus released from neighboring countries, such as China, and then to use an atmospheric transport model to predict how much would reach Taiwan.

Her ultimate goal is to bridge public health and engineering to produce new insight into how the flu spreads.



Irish seeks to minimize coastal disasters

Half of the world's population lives on or near the coast and can be affected by flooding due to coastal storms, such as hurricanes, and tsunamis.

These natural disasters can devastate communities, claim lives, and destroy sites of archaeological, cultural, and socioeconomic importance. In fact, extreme coastal floods can weaken the national and global economy and security.

Jennifer Irish, along with Robert Weiss in the Department of Geosciences at Virginia Tech, lead the coastal hazards research team at Virginia Tech which aims to alleviate some of these problems.

The group includes 45 faculty from 13 departments from all colleges across campus, studies the physics of inundation and sediment transport, as well as quantitative hazard assessment and hazard mitigation by natural features such as wetlands, coastal forest, and dunes.

There is also a new graduate

program in Disaster Resilience and Risk Management to further studies in this area.

The research group has four main research themes of disaster resilience, hazard assessment, process sedimentology, and natural infrastructure. Their focus is to reduce potential coastal hazards by identifying and understanding the interplay between population, economy, industry, infrastructure, and the environment.

The goal is to improve reliability of coastal hazard assessments and the overall understanding of the role that vegetation and beaches play in coastal hazard mitigation.

Irish has a research passion in coastal hazards, which led her not only to lead the Coastal Hazards at Virginia Tech group, but also to study the advancement of storm surge hazard assessment.

Sea levels have risen globally at a rate of 1.7mm/year over the last century and are projected to continue

to rise at a rapid rate. This threatens low-lying, narrow barrier islands.

While slight increases in protection can be offered, the greatest protection would be to raise the entire island, a feat that is not easily accomplished.

In another recent study of Barnegat Bay in New Jersey, Irish found that the timing and magnitude of bay storm surge relative to ocean surge were critically important for determining damage on developed barrier islands during hurricanes.

By shifting bay-surge timing, island erosion

was significantly reduced, up to 130%, in areas where the majority of coastal infrastructure was on the island.

While the majority of Irish's research focuses on storm surge hazard assessment, she was recently awarded a prestigious Fulbright fellowship that will allow her to aim to find ways to minimize the damage caused by tsunamis.

In her project, titled "Probabilistic Tsunami Hazard Assessment in the Context of Sustaining Israel's Archeological Sites and Coastal Infrastructure," she will seek to quantitatively characterize the danger tsunamis pose to the sustainability of ancient sites, modern infrastructure, and community prosperity in Israel.

This would be able to help preserve sites of archaeological and cultural significance and could be applied to tsunami forecasting to support early warning and evacuation.

Ultimately, the goal of this is to have a "more complete understanding of coastal hazard that will ultimately lead to more disaster resilient coasts," said Irish.

GEOTECHNICAL ENGINEERING

The Geotechnical Engineering Program enjoyed another successful year in research, teaching, and service missions. Highlights include:

- **Nina Stark** received both an NSF CAREER Award and a Young Investigator Award from the Office of Naval Research.
- **Adrian Rodriguez-Marek** serves as co-chair of the Geotechnical Earthquake Engineering and Soil Dynamics Conference in Austin, Texas. This conference is held once every ten years and bring together the top researchers in the field of geotechnical engineering.
- **Russell Green** was awarded the Whakapukahatanga Taiao Research Fellowship from the University of Auckland (New Zealand) and the 2018 CEE Alumni Teaching Excellence Award.
- Virginia Tech becomes a new associate member of the international Anura3D MPM research community. **Alba Yerro Colom** leads our involvement.

Every year, our graduate students enhance their professional development by attending national ASCE Geo-Institute conferences. The Duncan Endowment for Graduate Student Travel provides financial support to help make this travel possible. More information about the endowment and ways to contribute can be found at cee.vt.edu/duncan-endowment.

Tom Brandon is leading a team to develop a revised edition of the legacy manual NAVFAC 7.01 Soil Mechanics. The development team spans three universities and private consultants. The 30+ year old manual was once solely the domain of the Navy, but the revision will be addressing the needs of the Army and Air Force as well. The effort is scheduled to take two years.

Brandon and Castellanos have been active in the laboratory, conducting geotechnical tests for a variety of government and private organizations. The laboratory has had large projects testing the fully softened shear strength of fine-grained soils, as well as numerous tests of the engineering properties of coal combustion products.

Brandon has been involved as a consultant on several projects, including a 14-mile long ring dike in Texas, as well as a continuing involvement in the slope failure at the Chuck Yeager International Airport in Charleston, West Virginia.

Joe Dove continued his interdisciplinary research collaborations with faculty and students and is heavily involved in the undergraduate curriculum.

His research includes studies to improve the engineering properties of fine-grained soils, detect voids in the subsurface using geophysical methods, and a study on

construction-induced ground vibrations.

He served as program area coordinator over the past year for the geotechnical engineering program. He began serving the department as the director of curriculum and assessment and is now actively preparing for the department's upcoming ABET accreditation review.

He also continues to serve on the academic advising team for undergraduate majors, and as the chair of the curriculum committee.



Russell Green accepting the Alumni Teaching Excellence Award.

Emeritus Distinguished Professor **Mike Duncan** worked with **George Filz** as co-director of Virginia Tech's Center for Geotechnical Practice and Research (CGPR), and he supervised graduate students on research projects supported by the CGPR and CEE department.

During the past year, he served on the design review board of a new off-channel reservoir on the Lower Colorado River in Texas, and he provided design guidance for power line support structures in California for Pacific Gas & Electric Company.

Duncan continues to support geotechnical engineering graduate students in attending Geo-Institute conferences, with the generous assistance of friends and colleagues.

George Filz continues his research on a variety of topics, including braced excavation support and construction working platforms.

Filz continues to serve as co-director of the CGPR, faculty advisor of Virginia Tech's Geotechnical Student Organization, member of VDOT's Geotechnical Research Advisory Committee, member of the ASCE Geo-Institute Soil Improvement Committee, and consultant on geotechnical design and construction projects, particularly on improvements to dams, levees, and other infrastructure systems.

Russell Green is continuing his work studying the geotechnical aspects of earthquakes in New Zealand. As a result of his work on the New Zealand earthquakes, Green was awarded the Whakapukahatanga Taiao Research Fellowship from the University of Auckland.

Green is also involved in two projects in Iceland, assessing the seismic hazard of northeast Iceland and the influence of engineered fill on the dynamic response of structures.

He is continuing his work on two NSF-sponsored projects and two USGS-sponsored projects, related to various aspects of natural and induced seismicity; three of these projects are in collaboration with **Adrian Rodriguez-Marek**.

Green is an associate editor/editorial board member for two major journals and is a guest

associate editor for a third journal.

He is also serving on the American Nuclear Society (ANS) committee that is re-writing ANS 2.29 standard on PSHA for nuclear facilities.

In May, Green was awarded the 2018 CEE Alumni Teaching Excellence Award.

Matthew Mauldon teaches courses in geotechnical engineering, geological engineering and engineering rock mechanics.

This past year, he has started an investigation of geomechanical properties of the Hokie stone used to clad buildings on campus.

Mauldon has also begun work with **Tom Brandon** on a major revision to the engineering-geologic sections of the Naval Facilities Soil Mechanics Design Manual.

Adrian Rodriguez-Marek has spent the last academic year on sabbatical as a visiting professor in the Politecnico di Torino, in Italy, and working with various universities in Bolivia.

In Italy, he has collaborated with various colleagues on issues related to site effects and site characterization using stochastic methods.

He continues to collaborate with **Russell Green** on NSF-funded research focused on the development of an energy-based methodology for liquefaction assessment, and with various faculty in the CEE department on a multi-disciplinary project on Resilient and Sustainable Building Systems funded by NSF.

Rodriguez-Marek serves as the chairman of the Earthquake Engineering and Soil Dynamics committee of the Geo-Institute of ASCE and is an editorial board member for the journals *Earthquake Spectra*, *Bulletin of the Seismological Society of America*, and the *Journal of Geotechnical and GeoEnvironmental Engineering*.

Emeritus University Distinguished Professor **Jim Mitchell** serves as a member of the National Academies of Science, Engineering and Medicine (NASEM) Committee on Geological and Geotechnical Engineering (COGGE), and as a member of the Science Advisory Board for the NSF-sponsored Engineering Research Center for Bio-mediated

and Bio-inspired Geotechnics, comprised of four universities (Arizona State, UC Davis, New Mexico State and Georgia Tech).

Mitchell is co-editing, along with Ning Lu of the Colorado School of Mines, *Geotechnical Fundamentals for Addressing New World Challenges*, to be published in 2018. This book will contain chapters focusing on important geotechnical problems identified and discussed by participants in a National Science Foundation sponsored workshop held in 2016.

Nina Stark continued the development of a novel mobile sediment sampler funded by NSF. Two samplers have been successfully tested in the lab and under different field conditions.

She also continued her work on the rapid assessment of beach trafficability from remote sensing for ONR. This year, this work focused on determining friction angles and moisture content from optic and radar imagery.

Stark was awarded the NSF CAREER award and the Young Investigator Award by the Office of Naval Research.

She led two teams for the Geotechnical Extreme Events Reconnaissance Association during hurricane reconnaissance efforts.

Alba Yerro Colom began a project funded by Geopier Foundation Company to investigate the performance of Rammed Aggregate Piers (RAP) elements under the effect of dynamic loading.

This research was motivated by the 2010-2011 Canterbury Earthquake Sequence in Christchurch that resulted in a widespread liquefaction, and data

from subsequent soil improvement programs performed in the area is accounted to prevent the recurrence of similar catastrophes.

With the leadership of Yerro Colom, Virginia Tech is an associate member of the Anura3D MPM Research Community since September 2017. This corporation is currently formed by nine partners from Europe and the U.S. with the common goal of developing an advanced numerical software, based on the Material Point Method, for the modeling of large deformations and soil-water-structure interaction problems.

Yerro Colom continued her research on the study of large deformation problems in geotechnics such as slope failures, collapses in underground excavations, and soil-structure-water interaction problems.

She is also focused on the study of aeolian surface erosion in sand dunes.

Yerro Colom is developing two new graduate courses titled "Numerical Methods in Geotechnics" and "Modelling with MPM" which will provide extensive and in-depth knowledge of numerical modeling in geotechnics.



Geotechnical engineering students do a demonstration at the CEE showcase.

STRUCTURAL ENGINEERING AND MATERIALS

The SEM graduate program has over 70 graduate students, with more than 40 of these students participating in research. The Thomas M. Murray Structural Engineering Laboratory is busy with a number of projects, including full scale bridge beams, steel beam-column connections, composite floor diaphragms and two-way post-tensioned flat slabs. Lab operations run smoothly thanks to the efforts of **Brett Farmer**, **Dennis Huffman**, and **David Mokarem**. New cranes were installed in February, which double the lifting capacity compared to the previous cranes.

The group again offered CEE 3594 – Bridges, Builders and Society, which is team taught by the majority of the SEM faculty. Each faculty taught a three-class unit on some aspect of bridge design and construction. The class culminated with a 12 day trip through Italy, Austria, Switzerland, and Germany to visit the bridges that had been introduced in class. They also had the opportunity to visit the structural engineering labs at the University of Trento and The Technical University of Darmstadt.

A valuable member of our group, Vickie Mouras, Associate Professor of Practice, retired in December. She was a tremendous contributor to the group, particularly in our undergraduate teaching mission, and she will be sorely missed.

The following paragraphs provide more detail about the faculty members' activities over the past year:

Finley Charney continues to work in the area of seismic and wind engineering.

Most recently, he has increased his activities in wind engineering, and in doing so is actively involved in the update of the wind load provisions of ASCE 7 (for ASCE 7-22).

Much of his activity in wind engineering is related to developing new procedures for performance based wind design, and specifically understanding the behavior under extreme winds where it might be possible for the lateral load resisting system to exhibit some inelastic behavior.

Charney is chairing an ASCE Wind Division task committee that is exploring this issue, and is co-author for the analysis chapter in an upcoming ASCE pre-standard for performance based wind engineering.

Matthew Eatherton and his research group have continued their focus on developing new structural systems with enhanced earthquake performance and improving resilience and sustainability of structural systems.

The group is working on several ongoing multi-year projects including a multi-university collaborative project on seismic behavior of steel deck diaphragms, an NSF CAREER project related to high ductility

steel shear panels, a collaborative project on optimizing resilience and sustainability of building systems, a collaborative project working on computational simulation of steel fracture in structures, and a project developing new bolted end plate moment connections for metal buildings.

Eatherton's research group is active in outreach activities and professional service, such as hosting learning activities at several outreach events including C-Tech², Blast summer camp, Engineering Open House, and others.

Eatherton is a member of five professional committees and has authored design examples to be used by practicing structural engineers.

Madeleine Flint's research activities continue to focus on the design of resilient, sustainable, and durable structures. Active projects include: a multi-disciplinary NSF-funded collaboration developing a decision support system for multi-hazard building design; a collaboration between Virginia Tech, Stanford University, and Oak Ridge National Laboratory investigating the impacts of climate change on bridge collapse rates; and a newly-awarded collaboration with the Technical University of Denmark that will develop methods to translate climate model predictions

to site-specific meteorological boundary conditions used in deterioration models.

Flint has continued her professional service, and is now a member of the control group for the ASCE Infrastructure Resilience Division Risk and Resilience Measurement and Communication and Dissemination committees. She also participated in several NSF workshops and panels.

Matt Hebdon's research focuses on analysis, inspection, and preservation of bridges and transportation structures, primarily in the areas of fatigue and fracture, corrosion, and damage evaluation.

Hebdon has worked on the evaluation of fracture resilience of built-up steel members and a non-destructive method for determining in-situ rivet strength for historical bridges.

He is investigating the remaining capacity of prestressed concrete girders in a highly corrosive environment and proposed repair methods.

Hebdon is utilizing artificial intelligence and machine learning for reliable UAV assisted inspection of civil infrastructure.

He has also been heavily involved in the corrosion evaluation of a cost-effective stainless steel for the bridge industry. He is evaluating failures of anchor rods on highway structures and is assessing current fastener configurations used on steel bridges in the railroad industry.

Hebdon is active in steel bridge committees for AREMA, TRB, and AASHTO.

Eric Jacques is completing his first year at Virginia Tech and is establishing a Blast Research Laboratory focused on protection of critical infrastructure against terrorist bomb attack and accidental explosions.

His laboratory will feature a gas-detonation shock tube, unique to North American universities, to allow for economical full and scaled testing of structures under blast loads.

Jacques supports the Technical University of Dresden's Research Training Group GRK2250 "Mineral-bonded composites for enhanced structural impact safety" as an international expert, and actively serves the American Concrete Institute (ACI) Committee 370 – Blast and Impact Load Effects, Canadian Standards Association (CSA) Committee S850 – Design and Assessment of Buildings Subjected to Blast Loads, and CSA S852 – Blast Resistant Window Anchor Systems.

Ioannis Koutromanos completed and published a textbook on the fundamentals of linear finite element analysis (published by Wiley). This is the first book in a two-volume set. The second volume, currently under preparation, will be focused on nonlinear finite element analysis. Koutromanos has also been working on an NSF-sponsored project, in collaboration with **Matthew Eatherton**, to develop and calibrate analytical simulation tools for capturing inelastic deformation and fracture of structural steel members due to low-cycle fatigue.

He is also collaborating with **Roberto Leon** on simulating the cyclic performance of reinforced concrete beam-to-column connections, and evaluating the effectiveness of pertinent seismic design procedures.

Finally, he is working with **Carin Roberts-Wollmann** and **Matt Hebdon** on the computational and analytical evaluation of the impact of corrosion damage to bridge girders, as part of a project supported by the Virginia Transportation Research Council (VTRC).

Roberto Leon has continued his research on bond deterioration in reinforced concrete beam-column joints, resilient composite steel-concrete structures and behavior of large steel welded connections.

On the teaching side, Leon completed the renovation of the undergraduate construction material laboratory (Norris 129) and added new equipment and activities to the course, including new units on non-destructive testing of metals and concrete.

Leon continues to serve in numerous technical committees of ACI, ASCE/SEI and AISC, gave keynote lectures to international conferences in Xian (China) and Jenju (Korea), and successfully organized the CVIII International Conference on Composite Construction in Steel and Concrete.

Carin Roberts-Wollmann continues to focus on behavior of prestressed concrete bridges and buildings.

She has a continuing project with **Matt Hebdon** and **Ioannis Koutromanos** to investigate residual strength and repair techniques for corrosion damaged prestressed bridge beams.

Roberts-Wollmann has a large multi-year project underway to investigate the strength and performance of two-way post-tensioned flat slabs containing steel fibers.

She also has two projects monitoring the behavior of a post-tensioned segmental bridge in Richmond.



Students visited the Cascella bridge near Mesocco, Switzerland

Roberts-Wollmann continues to serve the American Concrete Institute (ACI) as a member of Committee 423 – Prestressed Concrete. She stepped down after six years as the chair, and was awarded the Delmar L. Bloem Distinguished Service Award for her efforts.

She is also serving as a voting member of Committee 318 – Building Code, and Committee 239 – Ultra-High Performance Concrete.

Maryam Shakiba's research focuses on composites modeling to understand and predict the response of infrastructure materials under mechanical and environmental loadings.

She has been working on multi-physics modeling of thermo-hydro-mechanical damage mechanisms of asphalt concrete at different

scales.

In another project funded through Center for Tire Research (CenTiRe), she is collaborating with mechanical engineering researchers to understand and model the fundamental thermo-chemo-mechanical mechanisms leading to tire abrasion due to tire-pavement interactions.

Shakiba was active in mechanistic materials modeling committees at ASCE-EMI and organized a mini-symposium on multi-physics multi-scale modeling of composites at the EMI conference.

She also held a successful workshop on computational materials modeling at Virginia Tech. The purpose of the workshop was to bring together researchers from different departments who are working on computational materials engineering to exchange ideas for securing NSF funding for integrative research in materials science and design.

TRANSPORTATION INFRASTRUCTURE AND SYSTEMS

The Transportation Infrastructure and Systems Engineering Program (TISE) had a productive academic year. The group includes the National Surface Transportation Safety Center for Excellence and the Federal Aviation Administration National Center of Excellence for Aviation Research (NEXTOR). TISE Program is comprised of 11 faculty members and 65 graduate students. Several TISE faculty are affiliated with the Virginia Tech Transportation Institute (VTTI). The group is supported **Sandi Wagener** as the group's administrative assistant.

During the past year, **Kathleen Hancock** relocated from northern Virginia to Blacksburg and looks forward to increasing her interaction with undergraduate students. She is expanding her work in highway safety analysis and visualization. Projects include developing methods for identifying high crash locations on networks, enhancing sketch planning models for safety planning and visualization, and mining unstructured officer crash narratives. She continues her work with Virginia DMV to locate all crashes on all roads in Virginia and to use the located crash data to evaluate current safety initiatives and identify new opportunities to improve highway safety in the Commonwealth. She is continually enhancing her use of technology to enrich teaching and learning in and out of the classroom.

Kevin Heaslip transitioned from the National Capital Region to Blacksburg in the last year. Dr. Heaslip has been reappointed as the Associate Director of the Electronic Systems Laboratory at the Hume Center for National Security and Technology at Virginia Tech. Heaslip has been conducting research on automated vehicle security for the National Science Foundation, connected and automated vehicle capacity for the Virginia Department of Transportation (VDOT) and transit signal priority planning for VDOT and the Virginia Department of Rail and Public Transit. He was recently awarded a \$3.125 million project from the United States Department of Energy for conducting research on cybersecurity for extremely fast charging of electric vehicles. He is an appointed member of the Resilient America Roundtable of the National Academies of Science, Engineering, and Medicine. Several students from Dr. Heaslip's research group completed their graduate programs in the last year and five students are expected to graduate

in the coming year.

Susan Hotle is an assistant professor who teaches Introduction to Transportation Engineering and Analysis of Civil Infrastructure Systems and, starting this spring, will teach Airport Planning and Design. She is a researcher in the NEXTOR II consortium and serves as principal investigator on a project sponsored by the Federal Aviation Administration (FAA) investigating surface performance and delay at core U.S. airports. Also, this past year she advised a student project sponsored through the Airport Cooperative Research Program (ACRP) Graduate Award on the impact of airport size on offered airline fares. Dr. Hotle is an active member of the Aviation Applications Section (AAS) of INFORMS, serving as a Best Student Presentation committee chair.

Bryan Katz was promoted this year to an Associate Professor of Practice. He continues to teach Introduction to Civil Engineering, Introduction to Transportation Engineering, Geometric Design of Highways, and Transportation Safety. In addition, he advises the Virginia Tech Institute of Transportation Engineers (ITE) student chapter. The ITE student chapter's Traffic Bowl Team won the State section and competed at the Southern District ITE meeting in Mobile, Alabama in the Spring. At the meeting, Katz was awarded the Excellence in Transportation Engineering Education Award from the Southern District of the Institute of Transportation Engineers. He brings practical experience into the classroom through his position at toXcel where he serves as the Vice President of Engineering. Katz remains active as a member of two Transportation Research Board Committees and was elected this year as Vice Chair of Research for the National Committee on Uniform Traffic Control Devices (NCUTCD)

Hesham Rakha, with researchers and students in the Center for Sustainable Mobility at the Virginia Tech Transportation Institute, worked on various national-level projects sponsored by the Office of the Assistant Secretary for Research and Technology, the

Professor Antonio Trani's class visited the Virginia Tech Montgomery Executive Airport on a class field trip.



PROGRAM AREAS

Department of Energy, and Ford. Rakha and his research team published 17 peer-reviewed journal publications, had two peer-reviewed journal papers accepted for publication, published 26 refereed conference publications, had 14 refereed conference publications accepted for publication, and made 33 conference presentations. He was one of two keynote speakers at the 5th IEEE International Conference on Models and Technologies for Intelligent Transportation Systems, Napoli, Italy. His work was cited over 1150 based on Google Scholar. Rakha serves as an Associate Editor for the IEEE Transactions on Intelligent Transportation Systems, the Journal of Intelligent Transportation Systems, the Journal of Advanced Transportation and serves as a member of the editorial board of the Transportation Letters: The International Journal of Transportation Research and the IET Journal of Intelligent Transport Systems.

Antonio Trani was involved in four projects sponsored by the Federal Aviation Administration (FAA). Two of the projects are evaluating the benefit of advanced air traffic surveillance procedures for oceanic flights. Hardware and software tools available in modern aircraft allow them to be spaced closer from other aircraft this improving airspace capacity. The Air Transportation Systems Laboratory has developed computer simulation models to test these procedures before they are implemented worldwide. Another project with FAA is evaluating the benefit of advanced weather information provided to pilots via a tablet application. This project involves the FAA and the National Center for Atmospheric Research (NCAR). The Air Transportation Systems Laboratory developed a large database to help airport designers to locate optimal runway exits. The database contains 14 million landing records and will be used by industry and FAA. Trani's group performed a recent study for NASA on the future use of supersonic aircraft worldwide. This study estimated the demand for six supersonic transport aircraft configurations with seating capacities ranging from 13 to 60 passengers. The study focused on the potential demand of "low boom" supersonic aircraft capable of cruising at 1.6 times the speed of sound over land with reduced noise impacts to the population.

Linbing Wang has devoted his research

to genome-based design methods for stone-based infrastructure materials, energy harvesting, green and sensing technologies, reliability and risk analysis, and safety of interdependent infrastructure. He has led the Virginia Tech efforts in the Regional University Transportation Center competition led by and granted to Pennsylvania State University. In the Spring, Dr. Wang developed and taught a new graduate course "Sensing and Deep Learning" for infrastructure health monitoring. He also successfully led the organization of an international workshop on international education of transportation infrastructure, May

26, 2017 in Beijing; and served as an executive co-chair for the 2nd Transportation Research Congress in May 2017, Beijing, China. As the departmental representative, Dr. Wang actively served as the president of the Engineering Faculty Organization of College of Engineering. Under his leadership and the Dean's strong support, the EFO established its Inspiration Seminar Series.

Professors Montasir Abbas and Gerardo Flintsch were awarded Dean's Awards for Excellence by the College of Engineering.





that by 250,000 vehicles and that is a significant amount of lost work time.

“The more we can minimize that, the more value comes back to society,” Hancock said. “If we can understand what is causing crashes, we can provide tools to minimize them and provide savings all around.”

Her career wasn’t always focused on highway safety though. When Hancock first graduated with her bachelors degree from Colorado State

University, she started working at Southwest Research Institute testing roadside barriers.

She then moved on to consulting in Washington, DC, but found that wasn’t what she wanted to do, which pushed her to go back and earn her advanced degrees from Vanderbilt University.

Throughout her career, she has studied highway safety, freight operations and planning, and geospatially enabling decision-making in relation to transportation problems.

During her time at Vanderbilt, she discovered geographic information systems (GIS) and started using that to find solutions to problems. That expertise enabled her to partner on a wide variety of projects, which she continues to do.

“My partnership with the DMV has been really great and, at this point in my career, I am excited to focus back where I started, on highway safety,” Hancock said.

Hancock works to improve highway safety

“Safety has always been a priority with me,” said **Kathleen Hancock**, associate professor in civil engineering. “The ultimate goal of my current research is to reduce fatalities on the roads.”

Hancock aims to do this through her partnership with the Highway Safety Office in the Virginia Department of Motor Vehicles (DMV). In an effort to improve safety, she developed a process for her team to look at every individual crash, which consists of about 130,000 annually, and to locate it as accurately as possible, even down to the lane it occurred in, based on information provided on the Virginia crash form.

She takes that a step further and provides specific reports that the DMV uses in workshops and that jurisdictions use for grant applications and other planning activities.

Hancock’s research group focuses on the human factors side of the data, including enforcement and programming, while other researchers focus on the road infrastructure side

of crash data.

Hancock works with graduate students and with the Center for Geospatial Information Technologies (CGIT) on campus to geocode and supplement the crash data and to solve problems such as identifying the highest crash intersections and using data mining techniques to extract information from the text that police officers write in their reports about the crashes and why they occurred. This information can also be used for on-demand support when officials ask for more information about a crash and what can potentially be done to avoid a similar circumstance in the future.

While the ultimate goal is to reduce crashes and fatalities, there is also a goal to reduce the cost associated with these crashes. These costs include not only the actual dollars associated with the crash but also the costs associated with traffic delay.

A fender bender in northern Virginia can cost 40 minutes in someone’s commute to work. Multiply

MEET THE VIA SCHOLARS

The Via Scholarships are made possible through the generosity of the late Mrs. Marion Bradley Via of Roanoke, Virginia, and her family. In 1987, Mrs. Via contributed \$5 million each to the Departments of Electrical and Computer Engineering and Civil and Environmental Engineering. Virginia Tech's Board of Visitors subsequently named the ECE department in honor of Mrs. Via's deceased father, Harry Lynde Bradley, and the CEE department in honor of her late husband, Charles E. Via, Jr. Mrs. Via died in 1993.

Both departments use a portion of the endowment to award scholarships to qualifying students. These scholarships are among the most competitive in the country. Since the Via endowment was created in 1987, the department has received more than \$20 million in support.

We are proud to acknowledge that this is the 32nd year of the Via endowment and the Via Report. We want to take this opportunity to recognize the current Via scholars as well as alumni that have come through the program for the last 32 years and continue to fulfill the mission set by the Via family.

UNDERGRADUATE

Benjamin Meseroll



Hometown: Brielle, New Jersey

Work Experience: Internship at Railroad Construction Company, Inc. doing estimating in Patterson, New Jersey and internship at George Harms Construction Company, Inc. in Howell, New Jersey.

Career Goals: I hope to become a PE and am excited to see where my career takes me. It has always been a dream of mine to begin my own company. I know how hard that is but I am excited for the challenge when the time is right.

Emily Potter



Hometown: Springfield, Virginia

Work Experience: Design Engineer Intern at Bohler Engineering

Career Goals: I would like to become a structural engineer, earn my PE license, and design and implement infrastructure abroad in developing regions.

Reese Williams



Hometown: Gate City, Virginia

Work Experience: Civil Engineering Intern in the Location and Design division of the Virginia Department of Transportation

Career Goals: My goals are to help my hometown of Gate City, Virginia grow in its infrastructure and development. I would like to benefit those in need with my work by designing a wide variety of projects over the course of my career. Although I will likely focus in Transportation and Infrastructure Systems, my dream job has always been to design baseball stadiums and other sports venues.

MASTERS

Stefany Baron



ENVIRONMENTAL AND WATER RESOURCES

Hometown: Seven Fields, Pennsylvania

Location of Undergraduate Studies: Penn State University

Career Goals: I hope to work on large scale stormwater management projects, such as the Deep Tunnel Project in Chicago. By managing the stormwater runoff from major cities with projects such as these, we can mitigate many of the pollutants that enter water bodies across the U.S.

Michael Bennett



GEOTECHNICAL ENGINEERING

Hometown: Berwyn, Pennsylvania

Location of Undergraduate Studies: Lafayette College

Career Goals: Become involved in the field of infrastructure geotechnics and help modernize American infrastructure.

Nick Brill



GEOTECHNICAL ENGINEERING

Hometown: New Orleans, Louisiana

Location of Undergraduate Studies: Virginia Tech

Career Goals: Obtain a master's and Ph.D. in civil engineering and eventually make a career doing research in coastal engineering

Michael Calfe



ENVIRONMENTAL AND WATER RESOURCES

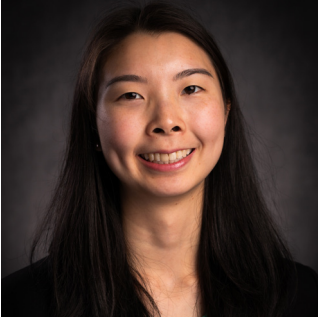
Hometown: Pittsburgh, Pennsylvania

Location of Undergraduate Studies: Clemson University

Career Goals: My career goal is to eventually get a job working as a hydraulic or ecological engineer for a stream restoration company.

MASTERS

Helen Chen



ENVIRONMENTAL AND WATER RESOURCES

Hometown: Fairfax, Virginia

Location of Undergraduate Studies: Virginia Tech

Career Goals: I plan to work in design and consulting to address hydrologic and hydraulic impacts of development, eventually obtaining my PE. I hope to continue to be inspired by new ideas.

Emma Coleman



CONSTRUCTION ENGINEERING AND MANAGEMENT

Hometown: Columbia, South Carolina

Location of Undergraduate Studies: Clemson University

Career Goals: To become an expert on the intersect between architecture and engineering and on the improved sustainable building practices. I would like to work in both academia and industry.

Matthew Ferby



ENVIRONMENTAL AND WATER RESOURCES

Hometown: Charlotte, North Carolina

Location of Undergraduate Studies: North Carolina A&T State University

Career Goals: Work for a research lab or consulting firm focusing on natural resource management and sustainable practices. I want to become a professor and impact future generations and empower members of underrepresented groups to pursue STEM careers.

Megan Geboski



STRUCTURAL ENGINEERING AND MATERIALS

Hometown: Warrenton, Virginia

Location of Undergraduate Studies: United States Coast Guard Academy

Career Goals: Continue my service in the US Coast Guard at a civil engineering unit or base facilities engineering department, working to provide short support and manage a variety of construction projects, allowing me to work toward obtaining my PE license.

MASTERS

Jack Gergel



STRUCTURAL ENGINEERING AND MATERIALS

Hometown: West Chester, Pennsylvania

Location of Undergraduate Studies: Penn State University

Career Goals: I plan to work for an engineering firm doing design and analysis of structures, including working on many exciting and innovative structural design projects. I also plan to earn my PE license.

Morgan Jenkins



STRUCTURAL ENGINEERING AND MATERIALS

Hometown: Knoxville, Tennessee

Location of Undergraduate Studies: University of Tennessee, Knoxville

Career Goals: I plan to complete my Master's degree and then go into industry with a focus on sustainability in respect to structures or continue to pursue a Ph.D. I would like to take my experience from industry into academia as a professor after acquiring my PE license.

Alex Juliano



GEOTECHNICAL ENGINEERING

Hometown: Lynnfield, Massachusetts

Location of Undergraduate Studies: Merrimack College

Career Goals: After earning my masters degree, I hope to return to geotechnical consulting in Boston and have the opportunity to work on complex and unique projects, while working to achieve my PE.

Colton Keene



STRUCTURAL ENGINEERING AND MATERIALS

Hometown: Richlands, Virginia

Location of Undergraduate Studies: Virginia Tech

Career Goals: My goals are to work as a structural engineer. After 6-10 years of experience, I plan to get my PE license and eventually work my way up to managing other design engineers and their projects within a structural engineering firm.

MASTERS

Roger Knittle



GEOTECHNICAL ENGINEERING

Hometown: Ringtown, Pennsylvania

Location of Undergraduate Studies: Bucknell University

Career Goals: My career goal is to become a professional engineer and ultimately take on a management role in a firm or start my own company.

Seth Lindley



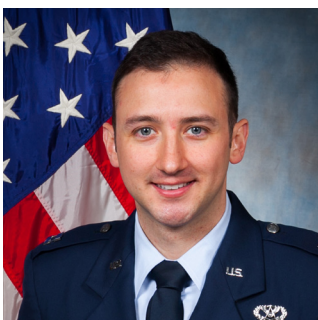
STRUCTURAL ENGINEERING AND MATERIALS

Hometown: Indianapolis, Indiana

Location of Undergraduate Studies: Purdue University

Career Goals: I would like to work in the area of structural restoration and rehabilitation.

Kyle Maeger



TRANSPORTATION AND INFRASTRUCTURE SYSTEMS

Hometown: Abbeville, South Carolina

Location of Undergraduate Studies: Clemson University

Career Goals: Continue to serve as a civil engineer and officer in the USAF and contribute to the sustainment of USAF infrastructure around the world.

Eric Matynowski



ENVIRONMENTAL AND WATER RESOURCES

Hometown: Clarkston, Michigan

Location of Undergraduate Studies: Michigan State University

Career Goals: Work in the water resources field with a focus in engineering and public policy.

MASTERS

Julie Paprocki



GEOTECHNICAL ENGINEERING

Hometown: Mingo Junction, Ohio

Location of Undergraduate Studies: University of Cincinnati

Career Goals: Work for a geotechnical design company working on large-scale projects and obtain my professional engineering license. Outside of work, volunteer with Engineers Without Borders and serve on international projects.

Jenna Ritchie



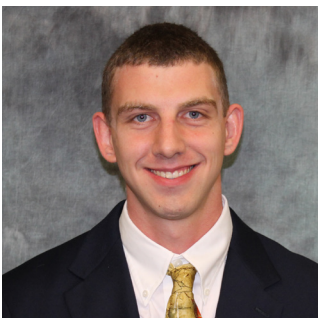
GEOTECHNICAL ENGINEERING

Hometown: Manahawkin, New Jersey

Location of Undergraduate Studies: Virginia Tech

Career Goals: My goals are to become a professional engineer, lead a multidisciplinary team of engineers to solve slope stability issues before they become emergencies, and ensure quality control to the point where no liability work has to be done on implemented projects.

Joshua Rosenthal



STRUCTURAL ENGINEERING AND MATERIALS

Hometown: Henrico, Virginia

Location of Undergraduate Studies: Virginia Tech

Career Goals: Work for a structural engineering firm and become a PE. I hope to be involved in large, challenging projects.

Zoe Schmitt



ENVIRONMENTAL AND WATER RESOURCES

Hometown: Larchmont, New York

Location of Undergraduate Studies: University of Virginia

Career Goals: Provide engineering consultation and expertise to cities that experience water management problems. I want to continuously learn about hydrology, climate change, and sustainability.

MASTERS

William Shaffer



GEOTECHNICAL ENGINEERING

Hometown: Madison, West Virginia

Location of Undergraduate Studies: Marshall University

Career Goals: Make contributions toward the betterment of society in the form of foundations, retaining walls, dams, and other geotechnical services.

Storme Spencer



ENVIRONMENTAL AND WATER RESOURCES

Hometown: Columbia, South Carolina

Location of Undergraduate Studies: Clemson University

Career Goals: I plan to pursue a career working toward purifying and providing clean water supplies in developing countries.

Zachary Sprinkle



CONSTRUCTION ENGINEERING AND MANAGEMENT

Hometown: Chesapeake, Virginia

Location of Undergraduate Studies: Virginia Military Institute

Career Goals: I aspire to be a building construction project manager.

Ryan Stevens



STRUCTURAL ENGINEERING AND MATERIALS

Hometown: Signal Mountain, Tennessee

Location of Undergraduate Studies: Virginia Tech

Career Goals: After earning my Master's degree, I would like to work in the structural steel industry as a fabricator or as an ironworker constructing tall buildings. Eventually, I would like to work for a structural engineering firm and become a PE.

MASTERS

David Woodson



ENVIRONMENTAL AND WATER RESOURCES

Hometown: Richmond, Virginia

Location of Undergraduate Studies: Virginia Tech

Career Goals: I have an interest in hydraulics with respect to stormwater and non-point source pollution. I want to apply these interests in private, public, or academic industries.

DOCTORAL

Maria Amaya



ENVIRONMENTAL AND WATER RESOURCES

Hometown: Columbus, Ohio

Location of Undergraduate Studies: The Ohio State University

Career Goals: Become a PE and apply my knowledge in an international setting as part of my professional practice in water resources and environmental engineering.

Matthew Blair



ENVIRONMENTAL AND WATER RESOURCES

Hometown: Clear Spring, Maryland

Location of Undergraduate Studies: Mississippi State University

Career Goals: After graduation, I would like to transition into industry work. Ultimately, I would like to work in both industry and academic settings.

DOCTORAL

Vincent Bongioanni



TRANSPORTATION INFRASTRUCTURE AND SYSTEMS

Hometown: Sacramento, California

Location of Undergraduate Studies: US Air Force Academy

Career Goals: To improve Air Force asset management and design practices in a resource-constrained environment.

Conrad Brendel



ENVIRONMENTAL AND WATER RESOURCES

Hometown: Elizabethtown, Pennsylvania

Location of Undergraduate Studies: Iowa State University

Career Goals: Conduct research and teach about current environmental issues, particularly water resource quality issues at the watershed scale.

Meredith Bullard



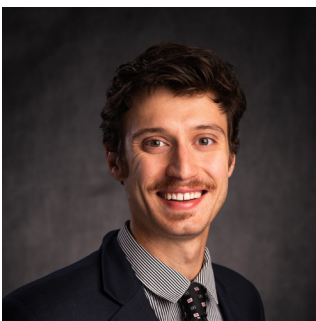
ENVIRONMENTAL AND WATER RESOURCES

Hometown: Garner, North Carolina

Location of Undergraduate Studies: North Carolina State University

Career Goals: I want to be a consulting engineer and return to teach at a university. My ultimate goal is to teach, mentor, and inspire young engineers.

Abraham Cullom



ENVIRONMENTAL AND WATER RESOURCES

Hometown: Leawood, Kansas

Location of Undergraduate Studies: University of Pittsburgh

Career Goals: I want to pursue an academic career through teaching and researching environmental microbiology.

DOCTORAL

James Hurley



ENVIRONMENTAL AND WATER RESOURCES

Hometown: Durango, Colorado

Location of Undergraduate Studies: University of Colorado at Boulder

Career Goals: To continue to do research to publish.

Rebecca Kriss



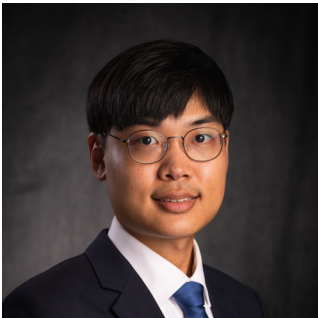
ENVIRONMENTAL AND WATER RESOURCES

Hometown: Landenburg, Pennsylvania

Location of Undergraduate Studies: Johns Hopkins University

Career Goals: After earning my doctorate degree, I would like to pursue a career in research, potentially in academia or the public sector.

Michael Lee



ENVIRONMENTAL AND WATER RESOURCES

Hometown: Pittsburgh, Pennsylvania

Location of Undergraduate Studies: Hanyan University, Seoul, Republic of Korea

Career Goals: I would like to be a professional in the field of coastal engineering as a researcher and educator.

Gregory Loflin



STRUCTURAL ENGINEERING AND MATERIALS

Hometown: Denton, North Carolina

Location of Undergraduate Studies: University of North Carolina at Charlotte

Career Goals: I intend to become a professional engineer and work in the structural design industry.

DOCTORAL

Kathryn Lopez



ENVIRONMENTAL AND WATER RESOURCES

Hometown: Miami, Florida

Location of Undergraduate Studies: Florida State University

Career Goals: I plan to become a professor to continue conducting research on aquatic contaminants and shape the learning experiences of young engineers. I also aim to become involved in environmental policy.

Seth Lotts



ENVIRONMENTAL AND WATER RESOURCES

Hometown: Richmond, Virginia

Location of Undergraduate Studies: US Military Academy at West Point

Career Goals: My goal is to be a university professor and make a significant contribution in the field of environmental engineering.

Ayella Maile-Moskowitz



ENVIRONMENTAL AND WATER RESOURCES

Hometown: Mount Rainier, Maryland

Location of Undergraduate Studies: University of Maryland, College Park

Career Goals: I plan on continuing my research in academia or in a national laboratory.

Ross McCarthy



TRANSPORTATION INFRASTRUCTURE AND SYSTEMS

Hometown: Corsicana, Texas

Location of Undergraduate Studies: Virginia Tech

Career Goals: Working for a government or private industry in managing infrastructure assets with a specific interest in the field of safety.

DOCTORAL

Emily Parker



ENVIRONMENTAL AND WATER RESOURCES

Hometown: Stockton, California

Location of Undergraduate Studies: University of California, Los Angeles

Career Goals: I hope to become an expert in urban water sustainability and help communities achieve more sustainable water practices through science/engineering, policy, and outreach

Jeannie Purchase



CONSTRUCTION ENGINEERING AND MANAGEMENT

Hometown: Ellenwood, Georgia

Location of Undergraduate Studies: Clemson University

Career Goals: I would like to pursue an industry career in project management of a sustainable building design and retrofits. I would also like to return as a professor that bridges STEM fields with sustainability concepts.

Tyler Quick



GEOTECHNICAL ENGINEERING

Hometown: Lexington, Kentucky

Location of Undergraduate Studies: Brigham Young University

Career Goals: I plan on continuing in academia as a university professor. I would like to continue researching while teaching and mentoring future civil engineers.

Samuel Sherry



STRUCTURAL ENGINEERING AND MATERIALS

Hometown: Allentown, Pennsylvania

Location of Undergraduate Studies: University of Oklahoma

Career Goals: I would like to pursue a career in academia as a researcher. I hope to apply my knowledge to advance research in the field of structural engineering, as well as instill my passion for learning and knowledge in future engineers.

VIA SCHOLARS

DOCTORAL

Kristin Ulmer



GEOTECHNICAL ENGINEERING

Hometown: Corvallis, Oregon

Location of Undergraduate Studies: Brigham Young University

Career Goals: I plan to become a university professor so I can perform research in the field I love, as well as encourage students to become excellent civil engineers.

Lucas Walshire



GEOTECHNICAL ENGINEERING

Hometown: Kalona, Iowa

Location of Undergraduate Studies: University of Iowa

Career Goals: Contribute to the US Army Corps of Engineers mission by providing technical support through practical and cost effective means. .

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