Scholarly Productivity Report 2015

Civil, Architectural and Environmental Engineering

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The CArE Department’s 2015 Scholarly Productivity Report is a collective effort by our team of faculty, staff and students. Our team has been hard at work promoting the S&T brand, as well as our reputation as a top educational research university. As a result of this hard work, we have over 90 journal publications and book chapters from our 24 faculty members in the department. In addition, our faculty and students delivered over 140 presentations at conferences around the world, including many that were invited as keynote speakers (see Dr. John Myers pg. 18). Great things are happening in our department and that is being projected around the globe.

As always, we are excited by the potential the future brings. In 2015, we welcomed two new members of the CArE team and plan for them to be strong contributors long into the future. Dr. Nicolas Libre (pictured below, second from left) was hired as an assistant teaching professor, bringing novel instructional methods and also previous experience as a director of research for the Construction Materials Institute (CMI) at the University of Tehran, Iran. Also, joining our team was Dr. Hongyan Ma from Hong Kong University of Science and Technology (HKUST). Dr. Ma brings a strong research record to Missouri S&T and perhaps most exciting, his position was created as part of the S&T signature area of Advanced Materials for Sustainable Infrastructure.

This signature area links to campuswide efforts and investment in the advanced interdisciplinary research and educational programs and was initiated by Dr. Kamal Khayat, the Vernon and Maralee Jones Professor of Civil Engineering. For the Advanced Materials for Sustainable Infrastructure area, hires were also carried out in materials science and engineering, where Dr. Aditya Kumar, assistant professor of ceramic engineering, was hired. So looking to the future, you will see Dr. Kumar’s name along with others across the S&T campus included often in our Scholarly Productivity as our team expands and grows.

The focus in infrastructure materials tracks directly to our departmental plan, Vision 2020, where we looked to leverage our current strengths and campus investment to project these strengths even farther in increasing our scholarly reputation among peers, our alumni and our current and future students. We look to the future with great expectations, as well as new efforts to broaden the expertise of our team, including six new faculty hires planned before the 2016-17 academic year.

So please take a look at our Productivity Report and keep an eye on the future, as we continue to advance and also engage the next generation of engineering students with programs like our Greenberg Scholars (pg. 21) — where the program is helping undergraduate students attain both their bachelor’s and master’s degrees at Missouri S&T and integrating classroom, laboratory and field experiences, as we build our next generation of S&T alumni to go out and change the world.

Follow our progress as we have exciting news, events and activities posted on our Facebook page (link on pg. 24) and on our website (care.mst.edu).

Signature Area – Advanced Materials for Sustainable Infrastructure

More on our faculty and students active in the Advanced Materials for Sustainable Infrastructure Signature Area can be viewed on YouTube at:

http://rol.la/advancedmat

Making progress
Dan Abbott
Lecturer, Mechanics
Education: M.S. Mechanical Engineering, Missouri S&T

Bate Bate, Ph.D.
Assistant Professor, Geotechnical Engineering
Education: Ph.D. Civil Engineering, Georgia Institute of Technology
Research Interests: Bender element study on Vs anisotropy of geomaterials, Spectral induced polarization in geomaterials, Complex dielectric conductivity of surfactant modified soils, High volume reuse of fly ash in geotechnical engineering, Effects of biopolymers on the water retention behavior (soil water characteristic curve)

Stuart Baur, Ph.D., A.I.A.
Assistant Chair, Architectural Engineering
Associate Professor, Architectural Engineering
Education: Ph.D. Civil Engineering, Missouri S&T
Research Interests: Design cost effective clean alternative energy, Develop new building technologies and practices through the use of materials and methodology, Generate intelligent responsive building systems

Jerry Bayless, P.E., F.ASCE
Associate Professor, Structural Engineering
Education: M.S. Civil Engineering, Missouri S&T
Courses Taught: Structural Analysis, Reinforced Concrete Design, Elementary Fluid Mechanics

Joel Burken, Ph.D., P.E., BCEE, AAEE
Interim Department Chair and Curators’ Professor, Civil, Architectural and Environmental Engineering
Education: Ph.D. Civil and Environmental Engineering, University of Iowa
Research Interests: Phytoforensics, Phytoremediation and natural treatment systems, Biological wastewater treatment, Constructed wetlands, Green remediation

Genda Chen, Ph.D., P.E., F.ASCE
Robert W. Abbett Distinguished Professor, Civil Engineering
Assistant Chair, Civil Engineering
Education: Ph.D. Civil Engineering, State University of New York at Buffalo
Research Interests: Structural health monitoring, Interface mechanics and deterioration of composite structures, Adaptive passive dampers and systems, Multi-hazards assessment and mitigation, Forensic study, Seismic analysis and retrofit, Soil-structure interaction, Bridge engineering
► Wen Deng, Ph.D.
Assistant Professor, Geotechnical Engineering
Education: Ph.D. Geosciences, Iowa State University
Research Interests: Multiphase flow, Chemical and thermal transport, Microbial growth in porous and fractured media, Areas of geo-energy recovery, Waste sequestration, Environmental remediation

► Mohamed ElGawady, Ph.D.
Associate Professor and Stirrat Faculty Scholar, Structural Engineering
Education: Ph.D., Structural Engineering, EPFL, Swiss Federal Institute of Technology, Lausanne, Switzerland
Research Interests: Seismic behavior of unreinforced masonry (URM) structures, Application of Fiber Reinforced Polymers (FRP) in strengthening and repair of masonry/reinforced concrete structures, Seismic behavior of reinforced concrete bridges, Damage-free bridge columns, Segmental construction, Rocking mechanics and the use of sustainable materials in seismic prone regions

► Dimitri Feys, Ph.D.
Assistant Professor, Materials Engineering
Education: Ph.D. Civil Engineering, Ghent University, Ghent, Belgium
Research Interests: Behavior of highly workable concrete in the fresh state, Rheology of complex materials and suspensions, Suspension flow and sedimentation, Fluid mechanics and flow modeling, Concrete made with recycled materials and advanced sustainability

► Mark Fitch, Ph.D.
Assistant Chair, Environmental Engineering
Associate Professor, Environmental Engineering
Education: Ph.D. Chemical Engineering, University of Texas at Austin
Research Interests: Constructed wetlands/Biochemical reactors for metals removal, Biofiltration/Membrane biofiltration, Nutrient uptake in streams

► Kamal Khayat, Ph.D., P.E., F.ACI, F.RILEM
Vernon and Maralee Jones Professor, Materials Engineering Director, Center for Infrastructure Engineering Studies Director, Center for Transportation Infrastructure and Safety
Education: Ph.D. Civil Engineering, University of California, Berkeley
Research Interests: Design and performance of advanced structural materials, including high-performance concrete with adapted rheology, self-consolidating concrete, Repair and rehabilitation of civil engineering infrastructure, Rheology and workability of cement grout, mortar and concrete, Physico-chemical interaction of chemical admixtures and modern hydraulic binders, Microstructure and properties of cement-based materials, Mechanical properties, visco-elastic properties and structural performance of specialty concrete, Durability and deterioration of cement-based materials in aggressive environments, Use of chemical admixtures, supplementary cementitious materials and fibers in concrete
Nicolas Ali Libre, Ph.D.
Assistant Teaching Professor, Structural Engineering
Education: Ph.D. Civil Engineering, University of Tehran, Iran

Hongyan Ma, Ph.D.
Assistant Professor, Materials Engineering
Education: Ph.D. Civil Engineering, Hong Kong University of Science and Technology

Cesar Mendoza, Ph.D.
Associate Professor, Water Resources Engineering
Education: Ph.D. Civil Engineering, Colorado State University
Research Interests: Hydraulics, Hydrology, Fluid mechanics, Sediment transport, Stream mechanics, Environmental hydraulics, Mathematical modeling

Glenn Morrison, Ph.D., F.ISIAQ
Professor, Environmental Engineering
Education: Ph.D. Civil Engineering, University of California, Berkeley
Research Interests: Indoor air pollution, Indoor surface chemistry, Pollutant transport, Exposure analysis, Building science

John Myers, Ph.D., P.E., F.ACI, F.ASCE, FTMS
Professor, Structural Engineering
Acting Vice Provost and Dean, College of Engineering and Computing
Director, Structural Engineering High-Bay Laboratory
Education: Ph.D. Civil Engineering, University of Texas at Austin
Research Interests: Structures/high performance concrete (HPC) behavior and durability performance, Fiber-reinforced polymers (FRP) in structural repair and strengthening applications with an emphasis related to concrete and masonry structures, and their durability performance, Development of environmentally sensitive construction materials, Hybrid materials and enhanced systems for blast resistant structures
Daniel Oerther, Ph.D., P.E., BCCE, AAEE, F.ASCE
John and Susan Mathes Professor, Environmental Engineering
Education: Ph.D. Environmental Engineering, University of Illinois
Research Interests: Environmental biotechnology and sustainable development with a special emphasis on water, sanitation, and hygiene (WaSH); food safety, security and nutrition; and poverty alleviation using design thinking and social entrepreneurship

Timothy Philpot, Ph.D., P.E.
Associate Professor, Structural Engineering
Education: Ph.D. Civil Engineering, Purdue University
Research Interests: Development of interactive educational software for the introductory engineering mechanics courses

Hefu Pu, Ph.D.
Assistant Professor, Geotechnical Engineering
Education: Ph.D. Geotechnical Engineering, University of California, San Diego
Research Interests: Energy-related geo-engineering, Coupled thermo-hydro-mechanical analysis, Numerical simulation in geomechanics, Ground improvement, Slope stability and retaining walls, Coupled flow and contaminant transport in deformable porous media Geo-environmental remediation

William Schonberg, Ph.D., P.E., F.ASCE, F.ASME, Assoc F.AIAA
Professor, Aerospace Engineering
Education: Ph.D. Civil Engineering, Northwestern University
Research Interests: Armor/anti-armor and penetration mechanics, Spacecraft vulnerability/survivability, Spacecraft shielding against meteoroid and orbital debris impacts, Hypervelocity impact phenomena, Building collapse/rubble modeling

Eric Showalter, Ph.D., P.E.
Associate Teaching Professor, Construction Engineering
Education: Ph.D. Civil Engineering, Purdue University
Research Interests: Information technology applications in construction, Environmental remediation, Productivity simulation, Cost effectiveness of technology

Lesley Sneed, Ph.D., P.E.
Associate Professor and Stirrat Faculty Scholar, Structural Engineering
Education: Ph.D. Civil Engineering, Purdue University
Research Interests: Reinforced and prestressed concrete structural members and systems, Structural models and experimental methods, Innovative methods of repair and strengthening of structures subjected to seismic loading or other extreme hazards, Structural hazard mitigation, Design codes and construction specifications for structural concrete
Jeffery Thomas, Ph.D., P.E.
Associate Teaching Professor, Mechanics
Education: Ph.D. Engineering Mechanics, Missouri S&T
Research Interests: Engineering education, Mechanics of biological materials, Design of percussion instruments, Residential construction

Jianmin Wang, Ph.D., P.E.
Associate Professor, Environmental Engineering
Education: Ph.D. Civil Engineering, University of Delaware
Research Interests: Sustainable technologies for advanced wastewater treatment, Synergistic toxic effect of nanoparticles and heavy metals, Fate and transport of heavy metals in natural and engineered systems

Grace Yan, Ph.D.
Assistant Professor, Structural Engineering
Education: Ph.D. Engineering Mechanics, Harbin Institute of Technology, China
Research Interests: Resilient infrastructural systems in multi-hazard environments, Structural health monitoring, Structural damage detection, Wireless sensor networks, Advanced signal processing, Nonlinear system identification and damage detection, Model updating of structural FEMs, Structural vibration control, Smart materials and structures

Roger LaBoube, Ph.D., P.E.
Curators’ Teaching Professor Emeritus
Education: Ph.D. Civil Engineering, Missouri S&T
Research Interests: Behavior and design of cold formed steel structures, Load and resistance factor design of steel structures, Design and behavior of light steel construction, Behavior of bolted and welded connections, Structural stability

David Richardson, Ph.D., P.E.
Chancellor’s Professor, Materials Engineering
Education: Ph.D. Civil Engineering, Missouri S&T
Research Interests: Properties of pavement materials (asphalt, concrete, granular base, stabilized soil, subgrades), Properties of building materials (concrete, masonry, aggregate), Pavement design and analysis, Materials testing (methods and evaluation)

Richard Stephenson, Ph.D., P.E.
Chancellor’s Professor, Geotechnical Engineering
Education: Ph.D. Civil Engineering, Oklahoma State University
Research Interests: Foundation design, Engineering behavior of soils, Embankment dams, Foundation engineering, Geotechnical engineering
**Bate, B.**


**Chen, G.**


**Burken, J.G.**


Deng, W.


ElGawady, M.A.


Feys, D.


Khayat, K.H.


Libre, N.A.


Ma, H.


Morrison, G.C.


Oerther, D.B.


Pu, H.


Richardson, D.N.


Schonberg, W.P.


Showalter, E.


Sneed, L.H.

Fakhariifar, M., 

Ren, W., 

Varnavina, A., Khamzin, A., Torgashov, E., 

Yang, Y., 

D’Antino, T., Pellegrino, C., Carloni, C., 

Ren, W., 

Carloni, C., D’Antino, T., 

**Wang, J.**

Wu, Q., Shi, H., Ma, Y., Adams, C., Jiang, H., 

Liu, G., and 

Liu, G., and 

Feng, P., Guan, X., Sun, Y., Choi, W., Qin, H., 

**Yan, G.**


Sun, Z., Krishnan, S., Hackmann, G., 

He, R., Yang, Y., and 
Baur, S.W.


Stanley, R.S., and Baur, S.W., “Evaluation of High School Pre-engineering Curricula through Missouri University of Science and Technology Student Survey Responses,” ASEE Midwest Section Conference, Springfield, MO, September, 2015.


Burken, J.G.


Chen, G., “Hilbert Transform and its Application in System Identification,” Proceedings of the Joint 6th International Conference on Advances in Experimental Structural Engineering (6AESE) and 11th International Workshop on Advanced Smart Materials and Smart Structures Technology (11ANCriSST), University of Illinois, Urbana-Champaign, IL, August, 2015, (invited).


Feys, D.

Feys, D., “Pumping of Concrete: Recent Developments and Future Challenges,” ACI Quebec and Eastern Ontario Spring Colloquium, Quebec-City, Canada, April, 2015, (invited).


**Khayat, K.H.**

**Khayat, K.H.**, Presentations with S&T Development Office for fundraising for the Advanced Construction Materials Laboratory (ACML), Rolla, Springfield, St. Louis, St. James, MO, and Anaheim, San Francisco, CA, 2015.


**Khayat, K.H.**, BIC Strategic of Advanced Materials for Sustainable Infrastructure, University of Missouri Board of Curator’s Meeting, Rolla, MO, April, 2015.


**Morrison, G.C.**


**Myers, J.J.**


**CONFERENCES (CONTINUED)**


Oerther, D.B.


Pu, H.


Richardson, D.N.


Schonberg, W.P.


Sneed, L.H.

Sneed, L.H., “Repair of Severely Damaged Reinforced Concrete Bridge Columns,” University of Illinois, Urbana-Champaign, IL, March, 2015, (invited).


Sneed, L.H., “FRCM Composites for Structural Strengthening Applications,” Purdue University, West Lafayette, IN, October, 2015, (invited).

Dr. Jianmin Wang developed a wastewater treatment system that is more efficient and uses less energy than conventional methods.

**CONFERENCES (CONTINUED)**

**Thomas, J.**


**Wang, J.**

Wang, J., “Thoughts on Wastewater Treatment Sustainability,” Tongji University, Shanghai, China, June, 2015, (invited).

Wang, J., “Nitrification Kinetics under Low DO Conditions,” Tongji University, Shanghai, China, June, 2015, (invited).

Wang, J., “Sustainable Wastewater Treatment and its Implications,” St. Louis University, St. Louis, MO, October, 2015, (invited).

**Yan, G.**

Yan, G., “Condition Assessment and Multi-hazard Mitigation of Long-span Structures,” Hong Kong Polytechnic University, Hong Kong, May, 2015, (invited).

Yan, G., “Damage and Instability Detection of Large-scale Structures,” Hunan University, Hunan, China, June, 2015, (invited).


The Aaron and Zelda Greenberg Scholars Program incorporates an estimated 10-15 students, annually, who work with their faculty advisors to develop a program of independent research study that weaves through both B.S. and M.S. degree programs.

Faculty advisors seek to find meaningful projects and incorporate external internships or other scholarly experiences along this path to enhance not only the Scholars’ academic development, but also their professional skillset.

The Greenberg Scholars are expected to obtain both the B.S. and M.S. degrees from the CARE Engineering Department in 5 years, and actively seek to attain national level recognition while doing so (e.g. by securing fellowships or awards from NSF, DOE, etc.). The Greenberg Scholars Program challenges our most talented students to reach their full potential while concurrently attracting prospective students to the challenges and opportunities the program provides.

The academic requirements, expectations and eligibility follow the established Master Student Fellowship Program.

2015 Greenberg Scholars (pictured from left to right):

- Sarah Jemison  » Advisor: Dr. Lesley Sneed
  Research: Investigating Bond Behavior of PBO Fiber-reinforced Cementitious Matrix Composites on Low Strength Concrete Interfaces

- Christopher Moore  » Advisor: Dr. Lesley Sneed
  Research: Investigating Anchorage for FRCM-concrete Joints

- Alexis Lee  » Advisor: Dr. Stuart Baur
  Research: Climate ‘SMART’ House

- Michael Janke  » Advisor: Dr. John Myers
  Research: Evaluation of Shear Behavior of Ultra High Performance Concrete

- Katherine Bartles  » Advisor: Dr. Joel Burken
  Research: Green Roof Leachate Water Quality

**ElGawady, M.A.**


**Fitch, M.**


**Richardson, D.N.**

Burken, J.G.


Chen, G.


ElGawady, M.A.


Richardson, D.N.


Schonberg, W.P.


Yan, G.

Yan, G., “Damage and Instability Detection of Civil Large-scale Space Structures under Operational and Multi-hazard Environments based on Change in Macro-geometrical Patterns/Shapes,” Annual report for NSF project, March, 2015.

Yan, G., “Highly Efficient Model Updating for Structural Condition Assessment of Large-scale Bridges,” Annual report for UTC project February, 2015.
Bate, B.

Burken, J.G.


ElGawady, M.A.

ElGawady, M.A. (PI), and Wang, J. (Co-PI), “Mechanical and Environmental Assessment of using Scrap Tires as an Aggregate in Construction,” Department of Natural Resources, August 2015 to July 2016; $205,388.

Feys, D.


Chen, G.


Khayat, K.H.
Khayat, K.H. (PI), Feys, D. (Co-PI), and Myers, J.J. (Co-PI), “University Transportation Center Tier 1: Research on Concrete Applications for Sustainable Transportation (RE-CAST),” Department of Transportation, September 2015 to September 2018; $923,700.

Khayat, K.H. (PI), and Libre, N. (Co-PI), “MoDOT: Roller Compacted Concrete for Rapid Pavement Construction,” Missouri Department of Transportation, December 2014 to February 2017; $90,000.


LaBoube, R.

LaBoube, R. (PI), “Wei-Wen Yu Center for Cold-Formed Steel Structures,” Steel Deck Institute, January 2015 to December 2015; $5,000.

LaBoube, R. (PI), and Yu, W-W. (Co-PI), “Wei-Wen Yu Center for Cold-Formed Steel Structures,” American Iron and Steel Institute, January 2014 to December 2015; $52,502.

LaBoube, R. (PI), “Wei-Wen Yu Center for Cold-Formed Steel Structures,” Metal Building Manufacturers Association, January 2015 to December 2015; $5,000.

Libre, N.A.


Morrison, C.G.


Pu, H.


Schonberg, W.P.


Sneed, L.H.


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Contests, news, events, photos, alumni connections and more!
Master of Science (with thesis)

Baudouin Maïco Aïssoun, “Influence of Rheological Characteristics of Self-consolidating Concrete on Durability,” Dual Ph.D. from the l’Université de Sherbrooke, Canada, and the l’Université de Cergy-Pontoise, France, June 2015, Co-advisor: K.H. Khayat


Jing Pan, “Effect of Temperature and Agitation Rheological Properties of Flowable Concrete with Adapted Rheology,” Dual Ph.D. from the l’Université de Sherbrooke, Canada, and the l’Université d’Artois, France, June 2015, Co-advisor: K.H. Khayat


Smith, J.D., “Behavior of Crimped Cold-formed Steel C-section Beams,” Advisor: S.W. Baur

Smith, K.A., “Advanced Sustainable Concrete Materials for Infrastructure Applications,” Advisor: J.J. Myers

Tarsgou, S., “An Investigation on the Efficiency of Self-consolidating Concrete Stability Measurement test Methods,” M.S. from the University of Tehran, Iran, September 2015, Co-advisor: N.A. Libre


Zhu, J., “Determination of Setting Times by Shear Wave Velocity Evolution in Fresh Mortar using Bender Element Method,” Advisor: B. Bate

Doctor of Philosophy


HONORS & AWARDS

Burken, J.G., Curators’ Professor, Department of Civil, Architectural and Environmental Engineering; Missouri University of Science and Technology, 2015.

Burken, J.G., President’s Award for University Citizenship: Excellence in Service, from the President’s Office, University of Missouri System, 2015.

Burken, J.G., Faculty Excellence Award – Missouri University of Science and Technology, 2015.


Khayat, K.H., Arthur R. Anderson Medal, for “energy and perseverance in developing and sustaining world-class research facilities and for solving highly significant problems on concrete design, materials, and construction,” American Concrete Institute, 2015.


Morrison, G.C., Otto Monsted Guest Professorship, Danish Technical University, Lyngby, Denmark, 2015-2016.


Myers, J.J., Faculty Research Award – Missouri University of Science and Technology, 2015.

Myers, J.J., Graduate Faculty Service Award – Missouri University of Science and Technology, 2015.

Oerther, D.B., AEESP Dentel Award for Global Outreach, Association of Environmental Engineering and Science Professors, 2015.

Oerther, D.B., Meritorious Honor Award, United States Department of State, 2015.

Richardson, D.N., Member – Academy of Civil Engineers, Missouri University of Science and Technology, Rolla, MO, 2015.

Richardson, D.N., Outstanding Teaching Award, Missouri University of Science and Technology, Rolla, MO, 2015.

Richardson, D.N., Chancellor’s Professorship, Missouri University of Science and Technology, Rolla, MO, 2015.


Sneed, L.H., Missouri University of Science and Technology Inaugural Stirrat Faculty Scholar Award, Rolla, MO, 2015-2018.

Sneed, L.H., Missouri University of Science and Technology Global Learning Outstanding Teaching Commendation Award, Missouri University of Science and Technology, Rolla, MO, 2015.

Sneed, L.H., Joseph H. Senne, Jr., Faculty Achievement Award, Academy of Civil Engineers, Missouri University of Science and Technology, Rolla, MO, 2015.


### BY THE NUMBERS

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<tr>
<th>Category</th>
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<td>Undergraduate Students</td>
<td>520+</td>
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<td>Full-time Faculty</td>
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**No. 3: College Factual/USA Today List of Top Engineering Colleges**

*(USA Today, July 2015)*

No. 3 and 14th Overall: Public university for annualized return on investment

*(PayScale.com, March 2015)*

**Civil Engineers** rank No. 5 in Best Engineering Jobs

*(U.S. News & World Report, 2015)*