

Civil and Environmental Engineering Newsletter  
North Dakota State University  
FALL 2015



# THE CIVILIAN



## A Message from the Chair

Dear Friends,

The Department of Civil and Environmental Engineering is pleased to present to you the new edition of the department newsletter. True to the mission of NDSU, the department prides itself on remaining a student-focused department with excellence in education as the main pillar and providing students with an environment that fosters creativity and individualism. In addition to the academic rigor, the students hone their skills in teamwork, leadership, professionalism and interpersonal skills through participation in various organizations, internships, and research. We are very proud of their success when they join the workforce and succeed or go for further studies.



The faculty with the active participation of graduate and undergraduate students create new knowledge through research that has led to important discoveries in the field, and that will improve the wellbeing of the society. The range of research topics are broad and are important to the state and the nation. Topics include new techniques for protecting the environment, new tools that will make flood forecasting better, developing next generation pavement materials, making our infrastructure truly smart and resilient, finding ways to better extract oil, making new materials for creating bone and studying cancer metastasis, and predicting expansive clay behavior among many other topics. In the last two years, a major investment in creating new state of the art laboratory spaces is underway. These include new fluids and environmental undergraduate laboratories in the new STEM building, and three new laboratories that include geo-structures laboratory with a strong wall and floor, infrastructure sensors laboratory and a nano-impact laboratory. Significant investment has been made to equip the undergraduate laboratories with state of the art equipment.

The department had a very successful ABET accreditation during the 2012-2013 visit, and a program review that lauded the department for success in education, research, and service. The department is in the mid-cycle for accreditation and the faculty, staff, and the advisory boards are preparing for the next round. Alumni and employers will receive surveys, and we would appreciate that they are completed and sent back to the department. With high enrollment numbers, the department also faces budgetary challenges to meet the needs of students. Recent major gifts for scholarships from Moore Engineering and Volk family will help provide scholarships for meritorious students. We look forward to continued support from alumni, friends and industry partners for scholarships, student activities, faculty professional development, equipment, space, and other critical needs to support the mission of the department to provide world-class education to our students. Generous outside support has become even more critical to bridge the widening gap between state support and the demand for resources to provide quality education. Only funds directed specifically to the department come to the department.

Wish you the very best in your professional careers as you make the world a better place for all to live in and happiness in your personal lives.

Very truly yours,

Dr. Dinesh R. Katti

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Newsletter Editorial Board: (L to R) Achintya Bezbaruah (Faculty Editor), Luisa Torres (Reporter) and Anurag Sharma (Student Editor, Graphic Designer)

# New Kids on the Block

## Dr. Ying Huang



Corrosion is a leading cause of failure in metallic transmission pipelines. It significantly impacts the reliability and safety of pipes carrying oil, water, and other fluids. It has long been a challenge for the pipeline engineers to accurately locate and monitor corrosion of underground metallic pipelines.

In an effort to search for a real-time corrosion assessment approach for metal pipelines, Dr. Huang's research group has developed innovative fiber optic sensing systems. To make them corrosion sensitive, long period fiber grating (LPFG) sensors have been coated with a thin layer of nano-iron/silica particles dispersed polyurethane on the outer surface. With the thin metal dispersed layer over an LPFG sensor, both its resonant wavelength and intensity of the resonant peak are altered.

Accelerated laboratory corrosion tests showed that the sensors could monitor both the initial and stable corrosion rates consistently. With multiple LPFGs in a single fiber, it is possible to provide a cost-effective corrosion monitoring technique for pipeline corrosion monitoring.



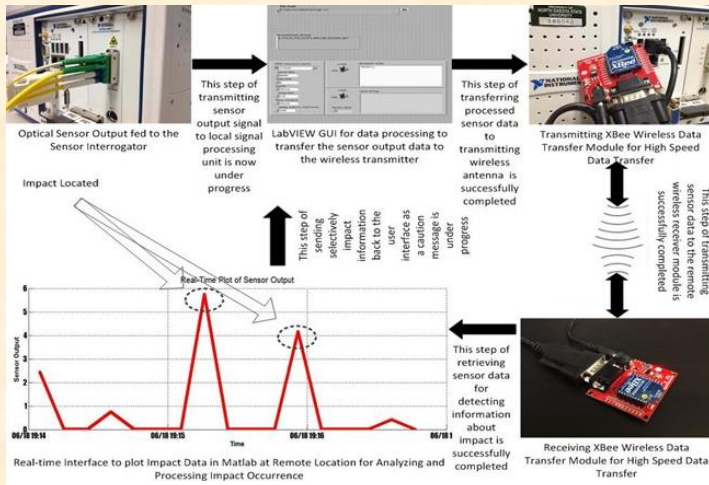
**Self-sensing thermally sprayed metallic coatings for pipeline corrosion mitigation and assessment (L to R): an example of pipeline corrosion, thermally sprayed metallic coating samples with sensors embedded, and laboratory corrosion test setup.**

Dr. Huang's group is also working on concrete pavement performance monitoring. The project is important because an accurate evaluation or assessment of the concrete pavement could lead to timely pavement maintenance and repair. Current pavement assessment mainly depends on roughness index measured by vehicle mounted mobile sensing system. The high cost and the nature of off-line measurement for the vehicle mounted sensing system limits its applications in major highways. Cost-effective, real-time and robust pavement assessment techniques are required for pavement assessment. Dr. Huang's research group developed glass fiber reinforced polymer packaged fiber Bragg grating (GFRP-FBG) sensors to evaluate the performance of concrete pavement. The GFRP-FBG sensors were successfully deployed in MnROAD facility of Minnesota DoT for validation. The MNDoT experiments exhibited the excellent field behavior and robustness of the developed sensors, and demonstrated their potentials for applications in concrete pavement monitoring.



**Innovative fiber optic sensors for pavement monitoring (L to R): a sensor, installation, and field testing at MnROAD, MN.**

## Dr. Mijia Yang

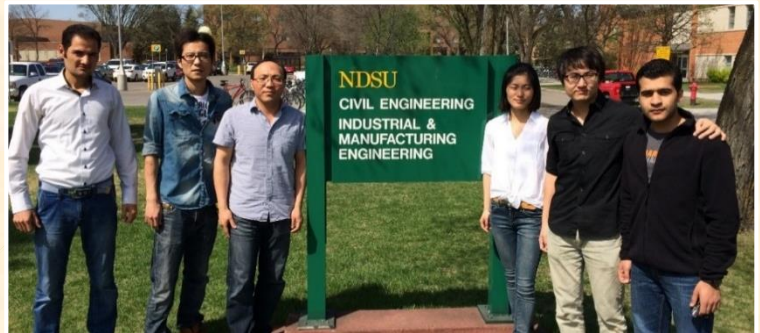


### Integrated impact/collision identification and structural health monitoring system for bridges in remote region

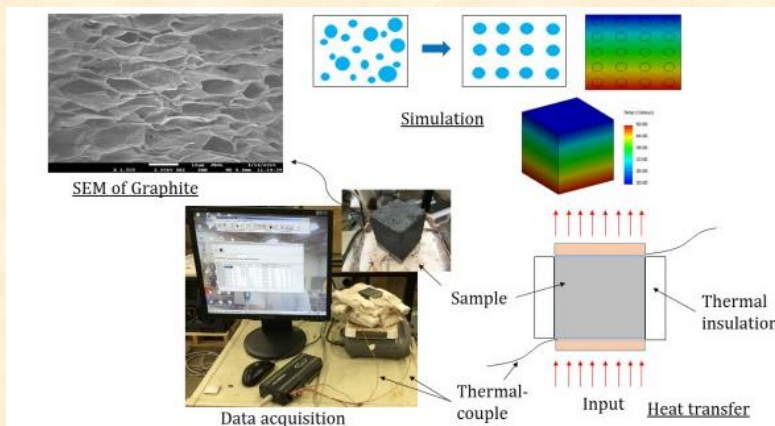
Dr. Mijia Yang's research group works on accelerated pavement repairs using Geopolymer concrete, fiber reinforced porous concrete, drive-by health status inspection of bridges, and reliability-based bridge settlement evaluation. One of his research areas involves the use of the green binder "Geopolymer" as an accelerated pavement repair material under aggressive environments. In order to achieve this goal, accelerated curing of Geopolymer in ambient conditions and durability of bonding between Geopolymer and existing concrete are addressed as the two key issues. The group has conducted experiments to determine the bonding strength between Geopolymer and existing concrete, influence of different admixtures and different mix ratios (such as  $\text{SiO}_2/\text{Na}_2\text{O}$  and water to solid ratio) on the properties of Geopolymer concrete and its bonding strength with existing concrete. Additional experiments are underway to characterize the freeze-thaw, wet-dry, weariness, and acid resistance of Geopolymer used on existing concrete.

## Dr. Zhibin Lin

Assistant Professor Dr. Zhibin Lin is the newest faculty member to join the Civil and Environmental Engineering Department. Dr. Lin comes to NDSU from the University of Wisconsin (Milwaukee). He works in the areas of Bridge Engineering, Earthquake Engineering, and Innovative Structural Materials with research focusing on: (1) high-performance resilient and sustainable civil infrastructure materials and systems, (2) extreme environment and multi-hazards resilient materials, and (3) rehabilitation of aging civil infrastructure.



Currently, his research group is working on projects on durability and sustainability of civil infrastructures. One of his project is on cold region reinforced concrete civil infrastructures with glass fiber reinforced polymer (GFRP) bars. Corrosion of steel reinforcing bars in conventional reinforced concrete is a serious problem when they are exposed to the aggression environmental. In particular, sodium chloride and calcium chloride based deicers are primarily responsible for the initiation of steel corrosion. Corrosion process and its byproducts damage the interface between steel bar and concrete, and, thus, degrade the bond strength, and ultimately shorten the service life. There has been an increasing demand for alternate materials and techniques for reinforcement in RC structures. Dr. Lin's research group is looking into the bond mechanisms, and bond characteristics of GFRP bars in concrete, and prediction of the service-life for this and other applications of engineering materials. Ultra-high performance concrete (UHPC) and cement-based composite materials strengthened with discontinuous fiber reinforcement are also being investigated.



### Development of phase change material based multifunctional laminates

The UHPC mixing is optimized from the cementitious matrix for tensile strength, compressive strength, and flowability. Bond characteristics of GFRP bars in the UHPC, particularly under aggressive environments, is of special interest to this group. Dr. Lin is also exploring the uses of recycled concrete for sustainable civil infrastructures. A number of graduate and undergraduate researchers are working with him on these projects. Two visiting scholars from Nanchang University in China will be joining the group next year. There are currently four PhD students, one MS student, and one undergraduate researcher in his group.

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# CEE Bags Bakken Projects

Researchers in the Civil and Environmental Engineering Department are working on issues related to oil exploration from the Bakken shale of North Dakota in an effort to make oil exploration more sustainable. Multi faculty involvement in the Bakken research brings in opportunities to the NDSU community to fulfill their land grant mission and provide learning opportunities to students.

Dr. Eakalak Khan is working on a Department of Energy supported project to assess microbial communities in the Bakken produced water. This work is a collaboration between NDSU, the University of Pittsburgh, and the Newfield Exploration Company (Houston, TX). The research is expected to benefit the oil and gas (O&G) industry across the globe in their chemical usage optimization, microbial fouling risk reduction, and corrosion risk minimization. The microbial ecology of conventional O&G reservoirs has been studied for decades. However, the microbial ecology of unconventional reservoirs (like the Bakken formation) which provides a substantially different physicochemical environment to microorganisms, are yet to be well characterized. There are opportunities to optimize existing approaches and develop new methods to measure and control microbial activities in unconventional O&G reservoirs. The research team at NDSU will identify 'Bakken microorganisms' utilizing high-throughput DNA/RNA sequencing methods. They will monitor the key microorganisms and nutrient cycling pathways at different stages of the shale O&G water life-cycle. The goal of the

research is to assess opportunities to discourage microbial communities that are unfavorable and encourage the growth of microorganisms that produce favorable conditions and, thus, decrease operational risks.

Dr. Zhibin Lin and Dr. Mijia Yang have bagged another project for developing cost effective dust control techniques in the Bakken area. This research team is currently exploring economy-based criteria for selection of dust control techniques, and developing full-spectrum dust control strategies in view of the ever-increasing road traffic in the Bakken region. Number of trucks on roads has a significantly increased with the rapid growth in oil production activities. Unpaved roads are common in the Bakken region and these roads are particularly susceptible to damage under heavy loads leading to higher atmospheric dust concentration. Dust typically lead to adverse impacts on air quality, agriculture, and the ecosystem. Most importantly dust can cause immediate safety and health hazards to road users and residents. Long-term impacts of dust pollution include adverse effects on local economy due to reduction of crop yields and increased healthcare expenses. Continued pollution may also lead to population migration. Establishing best practices for dust control applications is part of this project. The dust control strategies may include surface treatments, overlays to full-depth paving to accommodate different levels of traffic to sufficiently accommodate the demands.

## Undergraduate Researcher

### *Cody Ritt named National Goldwater Scholar*

Cody Ritt, a senior in Civil and Environmental Engineering at NDSU, has been selected to receive the prestigious Goldwater Scholarship. The Barry Goldwater Scholarship is awarded to the selected students of the field of science, technology, engineering and mathematics from across the nation. Cody's research is focused on practical methods for removing phosphate from eutrophic lakes and wastewater. At CEE department, he is working in Associate Professor Achintya Bezbaruah's Nanoenvirology Research Group. In the future Cody plans to earn a doctorate in Environmental Engineering. His goals are to join a research university and work on desalination of water to make more drinking water available to the people. As a Goldwater Scholar, he is receiving a scholarship that covers tuition, fees, books and living expenses up to \$7,500 a year.



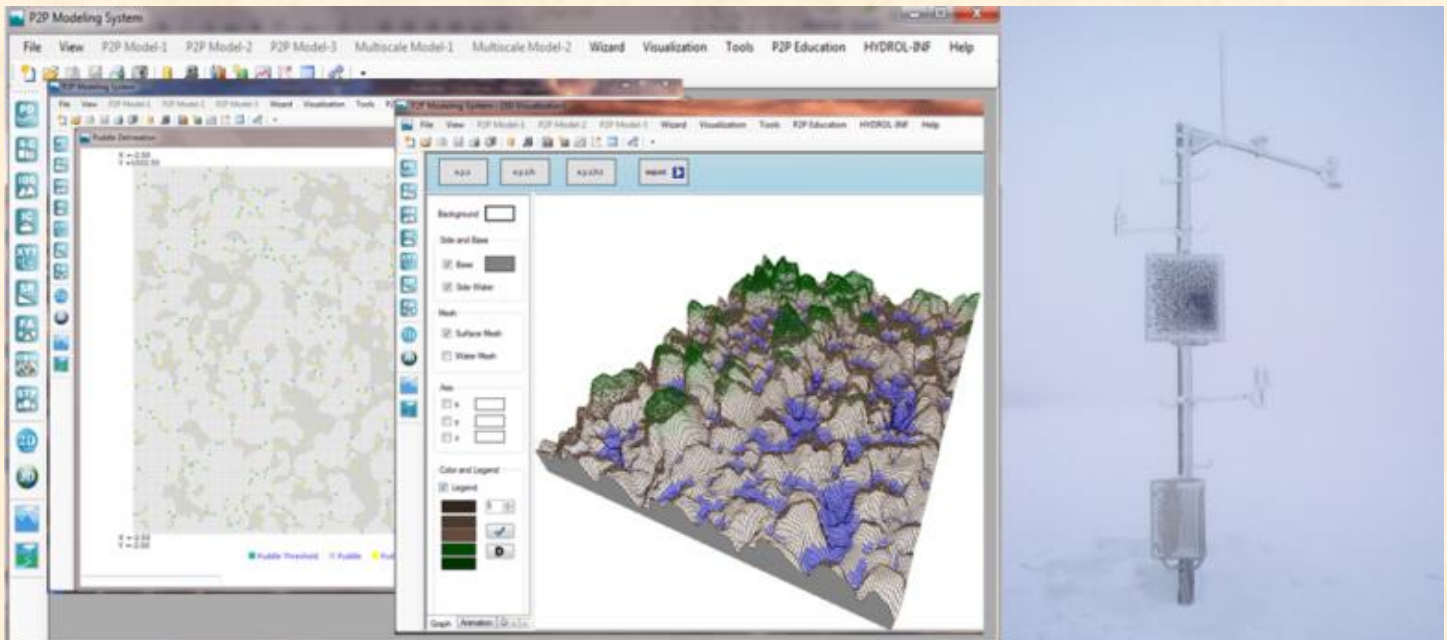
# Faculty Research Awardees

## *College of Engineering Researcher of the Year Award*

The College of Engineering recognizes excellence in the faculty research every year in the form of an award. The recipient of the Research of the Year Award for 2015 is CEE Associate Professor Xuefeng (Michael) Chu while the recipient for the previous year (2014) was Associate Professor Achintya Bezbaruah. The award, which is the highest from the College of Engineering, is awarded to a faculty member based on his/her research and creative activities that contribute to NDSU's research mission. The award carries a citation and cash reward.

## *Xuefeng (Michael) Chu, CoE 2015 Researcher of the Year*

The CoE Researcher of the Year Award for 2015 was given to Dr. Michael Chu in recognition of his contribution to engineering science. He obtained his PhD in Hydrologic Sciences at the University of California-Davis. His research areas include watershed hydrologic and environmental modeling, overland flow and infiltration, integrated modeling of flow and multi-phase contaminant transport in surface and subsurface environments, non-point source pollution and environmental assessment, groundwater modeling and management, and development of hydrologic and environmental modeling software. He is a member of several professional societies and committees and has served as a reviewer for more than 40 scientific journals and government funding programs. In addition, he has 31 journal publications 3 books chapters, and 4 proceedings papers. His most recent research, part of the NSF EPSCoR Center for Regional Climate Studies (CRCS) Project, focuses on the measurement and modeling of multi-scale watershed hydrology and topography. The CRCS will study linkages between regional climate, hydrologic processes, crop production, and autonomous farmer adaptations. The primary goal of the CRCS project is to develop and apply integrated methods to assess and predict climate change impacts on regional hydrology and agricultural production.

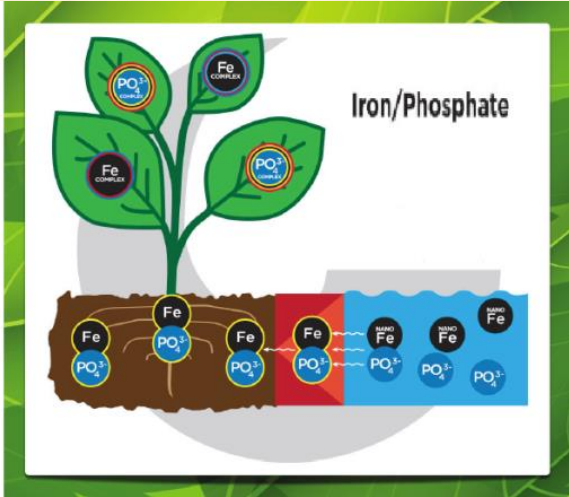


Dr. Chu and his group in Civil and Environmental Engineering will be involved in a series of CRCS research activities, including hydrologic monitoring and modeling. A number of field sites have been selected in North Dakota for collecting rainfall, snow, streamflow, and other meteorological and hydrologic data. New algorithms will be developed for automated topographic delineation and dynamic hydrologic connectivity analysis. An integrated hydrologic modeling (IHM) system will be developed and applied, at both local and regional scales, to examine the hydrologic responses to climate variations and climate-driven agricultural land use changes.

## *Achintya Bezbaruah, CoE 2014 Researcher of the Year*

Dr. Achintya Bezbaruah was named 2014 CoE Researcher of the Year by the Dean Gary Smith for his exemplary research involving multidisciplinary collaborations and research capacity building. Dr. Bezbaruah is an Associate Professor in Civil and Environmental Engineering and leads the Nanoenvirology Research Group (NRG) at NDSU. He obtained his PhD in Civil Engineering from the University of Nebraska-Lincoln. His major research areas are environmental applications and implications of nanomaterials, polymers for environmental remediation, nutrient recovery and delivery, life-cycle

assessment, contaminant fate and transport, and small community water and wastewater treatment. Dr. Bezbaruah was selected for the award based on his scholarly work, research funding, outreach activities related to his research, and research advising record. Examples of his work includes 21 journal publications, 3 patents, 3 book chapters, more than 80 conference presentations, and 10 proceedings papers. His current research is focused on life-cycle approaches to understand the interactions between crops and engineered nanoparticles at molecular level. This project is funded by the National Institute of Food and Agriculture (NIFA) of the United States Department of Agriculture (USDA).



He also received a NIFA-USDA grant to develop nanomaterials for the reduction of greenhouse gas emission from feedlots and agricultural fields. NIFA funded another of his project to procure a Zetasizer (for the characterization of nanomaterials) for his new Nano Impact Laboratory (NILab). North Dakota Department Commerce has funded his most recent project for the improvement of his biopolymer-based lake phosphate removal process and development of an iron and phosphate (*iPhos*) fertilizer.

### ***Dinesh Katti Named Engberg Endowed Professor and EMI Fellow***

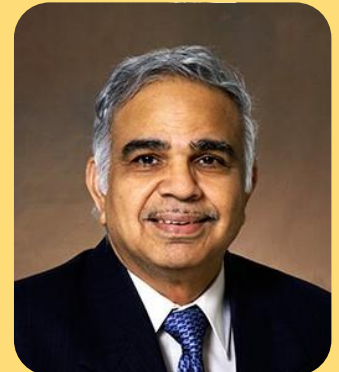


Dr. Dinesh Katti, Interim Chair and Professor in the Department of Civil and Environmental Engineering is the recipient of the Jordan A. Engberg Endowed Professorship for 2015-2017. This professorship was awarded by NDSU in recognition of Dr. Katti's contributions to in teaching, research and service. The award carries a two-year stipend for salary and other academic-related expenditures. CEE department is also proud to announce that Dr. Katti was presented the Engineering Mechanics Institute (EMI) Fellow Award at the EMI annual meeting at Stanford University. The award recognizes outstanding technical contribution to field as well as contributions to the institute. Dr. Katti has made groundbreaking technical contributions in the field of mechanics of biomaterials, nanomaterials, and geomaterials. He has been a passionate advocate of introducing molecular scale modeling for accurate modeling of nanoscale materials. Dr. Katti has served the Engineering Mechanics Institute for over 15 years and has contributed to various aspects of the organization in addition to making important personal technical contributions to the fields within EMI. He has served as chair of EMI technical committees including Properties of Materials Committee, Poromechanics Committee, and Molecular Scale Modeling and Experimentation Committee.

He also contributes as an associate editor to two EMI journals (Journal of Engineering Mechanics and Journal of Nanomechanics and Micromechanics). In the past, he was a part of a three-member committee that prepared the draft bylaws for the new EMI institute. He is instrumental in co-organizing the immensely successful symposium series on biological and biologically inspired materials since its inception in 2002. These symposia have attracted researchers from a variety of fields to EMI. Dr. Katti has initiated a new symposium series on "Molecular Scale Modeling and Experimentation" starting with the 2015 EMI Conference.

## **Padmanabhan Leads National TMDL Group**

Professor G. Padmanabhan was the lead instructor of a one-day workshop, "Modeling for Watershed Management and Total Maximum Daily Load Development (TMDL)," presented during the 2015 World Environmental and Water Resources Congress of the Environmental and Water Resources Institute, American society of Civil Engineers in Austin, Texas, May 17-21 2015. The workshop was sponsored by the institute's TMDL Analysis and Modeling Task Committee, which Padmanabhan chairs. Task committee members include representatives from various regions of the country, U.S. Environmental Protection Agency, civil engineering professionals, consulting firms and academia. Five members of the task committee jointly presented the workshop. A shorter version of the workshop was presented again at the institute's 2015 50th Watershed Management Conference Aug. 4-7 in Reston, Virginia. Padmanabhan organized and moderated two sessions at this conference as well.



# Graduate Researchers



**Navaratnam Leelaruban (Leelan)** is a Ph.D. Candidate in the Department of Civil and Environmental Engineering. He received a MS degree in Civil Engineering with water resources emphasis at North Dakota State University (2011), and a BS degree in Civil Engineering from the University of Peradeniya in Sri Lanka (2007). His current research in Professor G. Padmanabhan's group focuses on modeling droughts and its impact. He is also a Fellow of North Dakota Water Resources Research Institute. He authored and co-authored three peer reviewed journal publications, and four conference proceedings papers. In addition, he presented his research in many national and regional conferences. He won the third prize in the American Meteorological Society (AMS) applied Climatology Presentation Competition in the AMS annual meeting in Atlanta, GA (2010). He also received the North Dakota View Award (2009-2010) for his involvement in remote sensing and geospatial research work. Leelan is currently working as a Teaching Assistant in CEE Department for Fluid Mechanics and Environmental Engineering courses. He is the recipient of the College of Engineering 2014 Graduate Student Teacher of the Year Award in recognition of his contribution to undergraduate teaching.



**Anurag Sharma** is a Ph.D. candidate in the Materials and Nanotechnology program at NDSU. He completed his BS in Materials and Metallurgical Engineering at Indian Institute of Technology-Kanpur (2009). His primary research is simulation based design of scaffolds in Professors Kalpana and Dinesh Katti's group. He successfully designed sophisticated and reliable computer-based multi-scale methodologies to tailor an advanced materials system for tissue engineering applications. Anurag is also a part of a multidisciplinary project on impacts of nanoparticles on crops. Within this project, Anurag has studied the effects of carbon nanotubes on the Rice DNA. He authored and co-authored three peer reviewed journal publications, and presented his researches in several national and international conferences. In addition to academics, Anurag is also involved in many service activities and held various leadership positions. Currently, he is the president of Materials Research Society's NDSU Student Chapter. In the past he worked as a web administrator of the CEE website. He is the current Student Editor of The Civilian, the CEE newsletter.



**Lutfur (Robin) Akand** is a PhD student in Civil & Environmental Engineering working under the supervision of Dr. Mijia Yang. He has a BS degree in Civil Engineering from Bangladesh University of Engineering and Technology. At NDSU, he is working with an 'Innovative fiber reinforced pervious concrete composite' and developing a porous concrete that is durable and strong enough to withstand high-force impacts, heavy loads, and extreme freeze-thaw environments. He is also working on developing an accurate and user friendly computer model for the design of fiber reinforced porous concrete that incorporates the type of fibers, fiber-to-concrete ratios, amount of roughness and other variables. Robin's research is aimed at saving time and money in planning and design of new city projects. The new porous concrete will minimize flooding and also improve groundwater quality and quantity. Robin has recently been awarded the NSF Travel Award to participate in ASME McMat Conference' in Seattle, WA. He was one of the six finalists in NDSU's Three Minute Thesis Video Competition in 2015. As a finalist he represented the College of Engineering and showcased his fiber-concrete research work in the Legislative Showcase 2015 at North Dakota State Capitol, Bismarck.



# Meet the Dirty Water Warriors

## *CEE team wins 2015 WEF environmental design competition*



NDSU CEE Department's Environmental Engineering Design Team (EEDT) has reclaimed the country's top award after a gap of eight years! Thanks to the hard work of the student team and faculty advisor Dr. Wei Lin, NDSU EEDT won the first place in the WEFTEC Student Design Competition in the environmental design category. The 14th annual competition was held on September 27, 2015 as a part of the 88th annual Water Environment Federation Technical Exhibition and Conference (WEFTEC) in Chicago, IL. WEFTEC hosts two competitions: Wastewater Design (e.g. hydraulics, capacity design, and upgrades to existing systems) and Environmental Design (e.g. contemporary engineering topics such as sustainability and water reuse). The NDSU

student chapter team, who represented the North Dakota Water Environment Association (NDWEA), competed in environmental design category and won the best design team award (first place). Other winners in the environmental design competition were Florida Gulf Coast University (second place), University of South Florida (third place), and University of Wisconsin-Platteville (fourth place). The project, Water Reclamation for Irrigation of a Softball Complex, presented by the NDSU team was developed as a part of the Environmental Engineering Design (CE 499/696) class taught by Associate Professor Wei Lin in Spring 2015. The team included CEE seniors and graduate students. Zach Cormican, Anna Cunningham, Dane Ekdorn, Kellen Grubb, Kevin Kruger, Jacob Mitzel, Ursinio Puga, Dain Synhorst, Zach Thelen, Luisa Torres, Shane Traulich, and Nick Wyers were members of the design team. Several professionals, most of them NDSU CEE alumni, from area engineering consulting firms interacted with the class and helped the students in designing the award winning project. The CEE alumni who participated in the Environmental Design class were Bob Zimmerman (PhD, 1991), Tim Paustian (BS, 1996), Brian King (BS, 2000), Eric Dodds (MS, 2001), Seth Lynne (BS 2003), Josh Kamrud (BS, 2005), Joel Paulsen (BS, 2005), Murthy Kasi (PhD, 2011), Jacob Strombeck (MS, 2013), and Michael Quamme (MS, 2013). The project focused on determining the best design alternative to reclaim water from the Fargo wastewater treatment plant to irrigate a 21-diamond softball complex in order to conserve conventional piped water and reduce nutrients discharges into the Red River. The team that presented the final project during the WEFTEC included seniors Kellen Grubb, Anna Cunningham, Dain Synhorst, and graduate student Luisa Torres. North Dakota State University first joined the WEF Student Design Competition in 2004 winning the third place, and participated every year since then. The NDSU team won the first place in 2007 jointly with the University of Florida.

## *NDSU Team Wins 2015 Environmental Challenge*

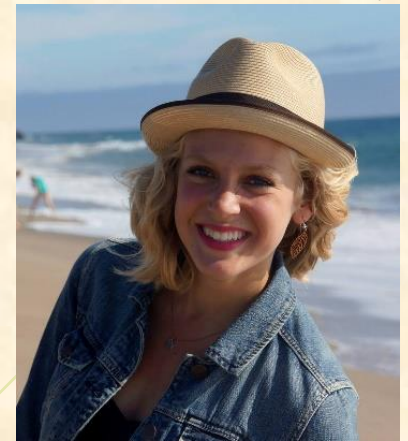
The Civil and Environmental Engineering (CEE) student team has once again won the first place in the Environmental Challenge (EC) organized as a part of the 2015 Conference on the Environment (COE) held at the Minneapolis Convention Center in Minneapolis, Minnesota on November 4. The NDSU CEE team has won this challenge every year from 2009 to 2013. The EC is part of the Annual COE where undergrad students from different universities present their solutions to real-life environmental problems. This year's event was sponsored by the Air & Waste Management Association's (AWMA) – Upper Midwest Section and Central States Water Environment Association's (CSWEA) Minnesota Section. The CEE undergrad students Cody Ritt (senior), Eric Miller (senior), and Joshua Hammermeister (freshman) represented NDSU and won the first place in the competition. The first prize carries as citation and \$1,500 in cash award for the department. The CEE team's project, Blue Lake WRRF Sulfate Reduction Project, was developed under mentorship of Associate Professor Wei Lin. It focused on designing a wastewater treatment plant for a fictive city located in Minnesota which was originally a mining city and is planning on transitioning into an eco-tourist city. The students had to take into consideration several factors including new regulations on sulfate discharge and stakeholders' acceptance of the solution. Because of their holistic approach that incorporated technical and scientific analyses, NDSU's work was judged as the best. The other two universities that participated in the competition were the University of Minnesota-Twin Cities and University of Minnesota-Duluth.



# Highlights on Civilians

## *Civilian in the Navy*

Lindsey Feyder, an alumna of Department of Civil and Environmental Engineering, is a civilian with the Navy at Puget Sound Naval Shipyard in Bremerton, Washington. She works with the nuclear waste and facilities division in the radioactive waste branch. This branch oversees the complicated waste management processes associated with all radioactive materials that come off ships and submarines. Her branch works closely with all other divisions in the Nuclear Engineering Department to ensure that radioactive materials are categorized correctly and managed appropriately. As an Environmental Engineer, she works on transportation of waste materials to the correct location so that they do not adversely affect the environment. At NDSU, she was involved with Kappa Delta Sorority for four years and served as Panhellenic Delegate and Academic Excellence Chair. She was actively involved in the Society of Women Engineers (SWE) since her first semester at NDSU and has served as the Vice President of Membership and the President of the society. She is extremely passionate about furthering women in engineering, specifically in encouraging young girls to opt for engineering as a career choice.



## *On the Guard*



Mitch Rosendahl is in Minnesota Army National Guard and has been there for more than eight years now. Once he commissions as a Second Lieutenant in the Spring of 2016, he will become a platoon leader. As an officer, he will plan and oversee construction projects the unit is tasked with. Mitch is graduating from CEE department in the Spring of 2016. He aspires to be a licensed professional engineer and work for a civil engineering company. At the same time, he also wants to be in a Minnesota National Guard engineering unit that mainly does civil engineering projects such as road construction; he just got accepted into the horizontal engineering company out of Cambridge, MN. He will continue to develop his skills as a licensed professional engineer and an engineering officer. The Army has given him motivation and taught him self-discipline as well helped him financially in college. He is confident that he will learn many things in both careers. The two careers that complement each other will make him professionally more prepared and help him grow. He plans on putting 20 years in the National Guard while moving up the ranks as an officer. He also plans to work as a PE until he is ready to retire.

## *National Recognition to CEE Alumna Haley Falconer*

Water Environment Federation (WEF) recently recognized CEE alumna Haley Falconer for her contributions to the water industry. She was awarded the Outstanding Young Water Environment Professional Award for her significant contributions to WEF and to the wastewater collection and treatment industry. This is the second time that this award was given to Ms. Falconer. She won this award earlier in 2012. The awardee was announced during the 88th annual Water Environment Federation Technical Exhibition and Conference (WEFTEC) in Chicago, IL in September 2015. The WEF annual awards recognize the individuals and organizations with outstanding contributes to the water environment sector and their member associations.

Ms. Falconer received her Bachelor of Science in Civil Engineering from NDSU in 2007 and her Master of Science in Environmental Engineering from Washington State University in 2009. She currently works for the City of Boise, ID as the Sustainability Program Coordinator. She has recently transitioned into her new role from HDR Engineering where she focused her time on wastewater facility planning, water recycling, low phosphorus treatment technologies, and NPDES permitting. Ms. Falconer is an active member of the Pacific Northwest Clean Water Association (PNCWA) in Idaho and serves in various committees in PNCWA as well as WEF. She recently completed her tenure as Chair of the WEF Students and Young Professionals Committee. Among her many other duties, Haley also serves as an active member of the NDSU CEE Advisory Committee.



# CoE Graduate Teacher Awardees

The Graduate Student Teacher of the Year Award is a prestigious award given by the College of Engineering (CoE) at North Dakota State University to encourage excellence in graduate student teaching. Each department within the CoE nominates their best candidates and a selection committee decides which student has the most outstanding record for the award. For two years in a row, Civil and Environmental Engineering graduate students have bagged the Graduate Student Teacher of the Year Award.

## *Anthony: 2015 Awardee*



The 2015 Graduate Student Teacher of the Year Award went to Anthony Waldenmaier for many good reasons. He helped in teaching several courses including CE 303 (Civil Engineering Materials), CE 316 (Soil Mechanics), CE 419 (Pavement Design), and CE 458 (Bituminous Materials and Mix Design). The technical knowledge and skills that he brings to bear on both lectures and laboratory sessions as a teaching assistant were the reasons for his selection as the Graduate Student Teacher of the Year. His students found him to be very passionate about teaching. He “consistently goes above and beyond the general responsibilities of a Teaching Assistant”. He stands out as teaching assistant because he shows great leadership in class and mentors his students with compassion. His experience as a Graduate Teaching Assistant has been very rewarding for him.

Anthony is a PhD candidate and an Engineer in Training. He received his B.S. in Civil Engineering in 2009 from NDSU and started Graduate School in 2010. He is doing his research on recycled asphalt pavement (RAP) for use in new flexible pavement projects under the guidance of Dr. Magdy Abdelrahman.

## *Leelan: 2014 Awardee*

Navaratnam Leelaruban (Leelan) has been named NDSU College of Engineering Graduate Student Teacher of the Year 2014. The CoE Academic Affairs Committee selected him based on his quality of teaching and instruction, and commitment to teaching responsibilities and fostering student learning. Dean Gary Smith presented him the award citation and cash award in the CoE Faculty Council meeting. Leelan is a Ph.D. Candidate and Teaching Assistant in the Department of Civil and Environmental Engineering. He received a MS degree in Civil Engineering with Water Resources emphasis from NDSU (2011), and a BS degree in Civil Engineering from the University of Peradeniya in Sri Lanka (2007). He has worked as a Teaching Assistant for Fluid Mechanics (CE 309) and Introduction to Environmental Engineering (CE 370) class. Each of these classes has a very high student enrollment but Leelan was able to deliver his best and serve all students very efficiently. In addition to the official assignments, Leelan always volunteers to demonstrate and teach hydraulic, hydrologic, and groundwater modeling software in technical elective classes. He is currently working on his doctoral research on droughts and their impacts under the guidance of Dr. G. Padmanabhan.



## The Front Desk Heroes

A note from an anonymous student: “Jan and Milka are the unsung heroes of the Civil and Environmental Engineering Department at NDSU. When faculty, students, and department sponsored student chapters are lost in clouded haze of course and meeting scheduling, department funding enquiries, and travel reimbursement formalities, Milka and Jan are always there to help! They direct you to the right person who can help. The department depends on them heavily and they ensure that the department runs like a well-oiled machine. Rules and regulations are at Jan’s fingertips. It is so amazing that Milka remembers each and every student by her/his name (and knows their hometowns too). Student chapters need to fill out forms, make vehicle reservations to go to competitions, claim reimbursements, and what not ... Shhhhh ... Jan and Milka do those for them. Milka and Jan make sure that students get the right help when they need.

Thank you, Front Desk, for everything you do for us,

Faculty, Students, and Student Chapters”

# Civilians in Sports

## Joe Haeg #59 Tackles All and Pursues a Big Dream



The NFL is keeping an eye on Civil and Engineering Department's Joseph (Joe) Haeg. The Bison Left Tackle (LT) has endeared all from across the state and the country. The six feet five inch, 310 pounder is projected for a possible NFL offensive tackle draft for 2016. Joe is among five NDSU football players who are being considered for the 2016 NFL Draft which will be held in April 28-30. He is currently ranked as the number 6 senior offensive tackle prospect and is number 90 overall in the country. He is in potential top-100 picks for the Draft according to NFLDraftScout.com. The hard work he has put on his football career has been noticed by the NFL scouts who consider him a fast athlete with terrific reaction quickness and vision to recognize the opponent's movements. Joe, a senior in CEE, is originally from Lake Shore, Minnesota. He joined NDSU as a redshirt in 2011 and since then his love for the sport has become his career. His football life started when he was in fourth grade and since then he enjoyed playing more and more. His commitment with the Bison has not stopped him from choosing a demanding major in Civil Engineering. His strategy to balance both responsibilities is based on keeping a schedule and focusing on one task at a time. On a normal day, Joe gets up early every day and goes to class in the morning, practices with his team in the afternoon, and dedicates the rest of the evening for studying and doing assignments for his courses. During his free time he enjoys outdoor activities such as hunting, fishing, and golf.

Joe has always loved the idea of being a civil engineer to create new things and devices. Last two summers he interned with Advanced Engineering and Environmental Services (AE<sub>2</sub>S) in town and earned valuable experience on water treatment, engineering design, and the F-M Area Diversion Project. He believes that industry experience and the knowledge obtained through his NDSU classes have helped him in his football career. The analytical approach that engineering students learn helps him to understand the opponent's defense by looking it as a pattern and trying to find tendencies for opponent's weakness in certain situations. Joe thinks that engineering students should be involved in different activities on campus because "it helps you meet new people, make friends, and build your network both personal and professional levels.

## Golfing his Way to Graduate School



A key player of NDSU Golf Team Ursinio Puga Gil was interviewed during his senior year at CEE in NDSU. Ursinio Puga Gil is originally from Spain and has called NDSU his home. This year he joined the Environmental Engineering master's program at CEE. There are 10 people in the Golf Team at NDSU and only 5 people travel to tournaments. "I have made it to the list of the first 5 (traveling team) in 3 out of 4 years at NDSU, so that is quite an accomplishment for me. My scoring average improved every single year; it went from 81 shots (Freshman Year) to 76 shots (Junior and Senior Year)."

**Q:** Did Civil Engineering help you achieve your goals? **Ursinio:** I think Civil Engineering has helped me a lot. Being enrolled in such a demanding major and being involved in athletics at the same time helped me improve a lot of skills (time management, for example). All these skills will help me in the long run to achieve my life goals in my opinion.

**Q:** Your future goals vis-a-vis your career in Civil Engineering and golf? **Ursinio:** Golf will always be my passion. I will work as a Civil Engineer and play golf during my spare time.

**Q:** What did inspire you to pursuing golf? **Ursinio:** I started playing golf when I was about 3 years old back home in Spain. I loved it so much that I put a lot of hours into the game and started to get better over time.

**Q:** What are your involvements in student organizations on campus? **Ursinio:** I am involved in a bunch of organizations like TBP (Tau Beta Pi Engineering Honor Society), AWWA (American Water Works Association), and WEF (Water Environment Federation). I just joined AWWA and WEF this semester so I haven't done much but doing volunteering work from TBP.

### ***Colin Paarmann brings glory to NDSU Track and Field***

Balancing academics and athletics: Balancing academics with athletics throughout my collegiate career has taught me the meaning of hard work and discipline. It has taught me how to set goals, organize my time, and be a leader. I like to look at being in student athletics not as a burden, but as an opportunity to bring these traits to the surface. Fortunately, I am surrounded by supportive teammates, coaches, professors and family that make this not only easier, but enjoyable as well. I wouldn't trade my experience as an NDSU student athlete for anything, and as always, GO BISON!

Achievements: Summit League All Conference Honors (2014) and Summit League Commissioner's List of Academic Excellence (2014).



### ***Matthew Jennings shines in Track and Field***



Balancing academics and athletics: Balancing academics with athletics is a daily battle. There are some days when I have a hard time focusing in my classes when I have a big race coming up. Likewise, there have been plenty of times during training runs I find myself zoning out thinking about upcoming tests, quizzes and homework. While these types of days are sometimes a struggle, there are advantages to being a student athlete. Going to practice gives me the perfect excuse to take a break from studying. It takes my thoughts off the subject and lets my mind relax so when I pick up the book again I'm ready to go. Also vice versa! Just as having multiple practices a day has kept me on campus I find that the best way to kill time is to work on homework and reports, and study for upcoming exams. The best part is that all my coaches and teammates have created a great support group for me to rely upon for my academics. They're the reason I'm able to balance academics with athletics and have a great time, while attending college as a North Dakota State student athlete.

Achievement: Summit League All Conference Honors (2014)

## **Civilian in Student Government**

### ***The multi-faceted Eric McDaniel, the Student Body President***



Eric McDaniel, senior in Civil Engineering, is the NDSU Student Body President elected last spring for 2015-16. Eric is originally from Bismarck, North Dakota and he likes to dream big. Two of his favorite hobbies are traveling and learning new things. He visited China in 2014 as a part of his minor in Business learning experience, and Guatemala in 2013 as a volunteer for The God's Child Project. This is just a hint of what Eric McDaniel is interested in and what has shaped his life. A senior in the CEE department he is doing a minor in Business through which he is getting a certificate in Professional Selling. He believes that by combining Civil Engineering and Business he has been able to develop both hard skills and soft skill which he has applied in many of his involvements in multiple NDSU organizations. The mixture of these two disciplines has served him well in his role as the University Student Body President where he constantly needs to apply analytic reasoning and good interpersonal skills.

To simultaneously work as the Student Body President and play active roles in Sigma Alpha Epsilon, Blue Key Honor Society, and Order of Omega he has to work hard. Eric has learned to balance these responsibilities with his academic life by managing his time well, following a strict daily schedule, and prioritizing tasks. Despite the hard work it takes to be as involved as he does, Eric McDaniel encourages other CEE students to be part of different organizations because "it helps you develop in professional ways that you won't get in the classroom."

# CEE Outreach

## *Kindred High School Stick Bridge Contest*

As part of CCE's on-going efforts to reach out to area schools, Assistant Professor Zhibin Lin and students Ryan David, Kyle Blank, Lindsey Feyder, and Zhiming Zhang assisted in organizing and judging the stick bridge contest at Kindred High School, Kindred, ND.



The members of CEE team worked with seventh and eighth graders in the school. They assisted them in building popsicle stick bridges by teaching them the mechanisms for structural stability under loading conditions. During this 6-week program the CEE students mentored the Kindred students on successful bridge making while working in groups. On the final day, the CEE team made a presentation to the participating students on bridge design, construction, and performance.



## *Mentoring Future Engineers*

As ND Governor's School faculty mentor Dr. Zhibin Lin enrolled two high school students, Chance Fanta and Jackson Smith, into his group for summer research (2014). The students worked on a project aimed at the understanding of the mechanical properties of concrete reinforced with discrete fibers. Various fibers, including PVA fiber, glass fiber, and steel fiber are embedded into the concrete. The compressive strength and impact resistance of fiber reinforced concrete were evaluated through standard cylinder tests and built-in drop weight impact tests. This project provided good hand-on training to the high-schoolers on concrete mixing, wood formwork, and testing. The graduate student in Dr. Lin group had an opportunity to mentor the future engineers. Chance and Jackson presented their work in the poster session organized as a part of ND Governor's School.



# Student Organizations

Students from the Civil and Environmental Engineering Department are active on service and co-curricular activities along with their studies. Overall individual student development is encouraged and promoted through student organizations.

## *Institute of Transportation Engineers (ITE)*

ITE is an organization for students interested in Transportation Engineering. ITE's membership within the North Central Section



and the Midwest District provides scholarships and opportunities for participation in regional and international conferences. Students who participate in conferences get networking opportunities with potential employers and industry leaders.

NDSU's ITE Chapter bagged the third prize at the Midwestern District Traffic Bowl meeting held in summer of 2014. NDSU members also attended the ITE 2014 Annual Meeting and Exhibit held in Seattle, WA.



## *Society of Women Engineers (SWE)*

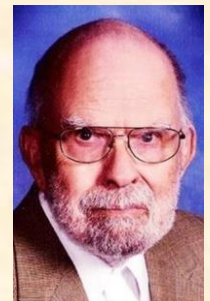
The goal of NDSU SWE chapter is to help its member to network with other students and potential employers, gain knowledge, experience and the skills necessary for professional engineering work. SWE is involved in various outreach programs for younger girls to encourage them to go for careers in science, technology, engineering, and mathematics (STEM). The largest outreach program of SWE is called TechGYRLS. It has been running for the past 12 years. The program teaches engineering principles to 3rd through 7th grade girls twice a week for 10 weeks each semester.



The goal of the program is to get the girls thinking about engineering as a future career choice. SWE student leaders get consistently positive feedback on this program and are always looking for good role models and volunteers for the program. NDSU SWE has won the Organization of the Year and Community Service Project of the Year Awards at NDSU. Contrary to popular belief, SWE is not just for women. The Society welcomes men to all of their meetings and events. It is for anyone who supports women in engineering, and this can include men! In fact, some of the most involved volunteers with TechGYRLS are men.

## In Memory of J. Darrell Bakken

Alumnus J. Darrell Bakken passed away on Saturday, November 28, 2015. Darrell, originally from Wahpeton, ND, graduated from NDSU in 1952 with a B.S. degree in Civil Engineering. He was a long-time supporter of the Civil and Environmental Engineering Department and also introduced a scholarship fund in his name. He had extensive engineering experience from careers with the Medical Service Corps of the U. S. Army, South Dakota State Department of Health, and the Indianapolis Water Company. Darrell was an active member in several engineering associations including American Water Works Association, American Academy of Environmental Engineers, American Society of Civil Engineers, Water Environment Federation, and Indiana Water Pollution Control Association. He will be dearly missed by NDSU's Civil and Environmental Engineering family.



# CEE Advisory Board Meeting

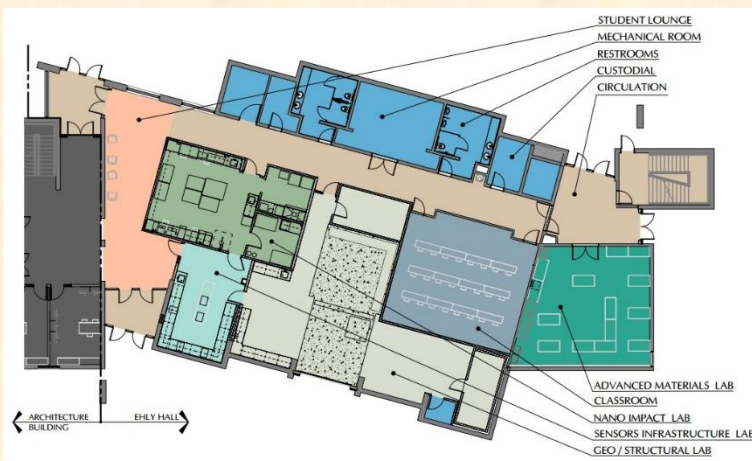
Homecoming week 2015 was full of activities where students, alumni, family, and staff celebrated their Bison pride. While these activities were happening, the Civil and Environmental Engineering Department held its Fall Advisory Board (AB) meeting to show their Bison pride in a different way - their commitment to education. The AB meeting takes place every semester to discuss issues relevant to the Civil and Environmental Engineering Department. This semester's session was held on Friday, October 9,

2015 at the Hidatsa Room in NDSU Memorial Union. The meeting took place between the AB, Student Advisory Committee (SAC), faculty, and staff from the CEE department in two different sessions. During the morning session, the AB members met the SAC members to discuss the different activities undertaken by the SAC and its future plans. In addition, members from both committees went through different action plans to improve teaching, advising, and education in CEE in order to ensure the competitiveness of NDSU in the Civil and Environmental Engineering job market. Some of the areas identified for improvement are students' computational skills, and Fundamental of Engineering examination results, and CEE curriculum.



During the afternoon session, graduate student Luisa Torres presented the WEFTEC Environmental Design Award winning project on water reclamation for irrigation of a softball complex. The NDSU team won the national first place in the Student Design Competition in the 2015 Water Environment Federation Technical Exhibition and Conference (WEFTEC). Also, the AB presented the results from the morning session to the faculty and staff from the CEE department. The members from the AB who attended the session included Eric Dodds (AE<sub>2</sub>S), Nick Gludt (Moore Engineering), Brian King (Ulteig), Jeremy McLaughlin (Houston Engineering), Lance Meyer (City of Minot), and Travis Wieber (KLJ). Representatives from the SAC included Dylan Dunn, Cody Ritt, Keshab Thapa, and Gabriel Brien. The faculty from the CEE department that attended the meeting included Department Chair Dinesh Katti, G. Padmanabhan, Kalpana Katti, Xuefeng Chu, Wei Lin, Achintya Bezbaruah, Ying Huang, Mijia Yang, Magdy Abdelrahman, and Eakalak Khan. CEE department staff, Jan Lofberg and Milka Singha, attended the session.

# Ehly Hall: The New Research Hub



CEE faculty has three new laboratories in Ehly Hall. Architecture and Landscape Architecture Department has moved out of Ehly Hall to the Downtown Campus of NDSU. The building has gone through extensive renovation. The main purpose of the renovation project is to provide more teaching and research space to the engineering faculty. The renovated building will house CEE's Geo/Structures Laboratory, Nano Impact Laboratory, and Sensors Infrastructure Laboratory.

**Ehly Hall renovation – Main floor plan showing the location of the new CEE laboratories.**

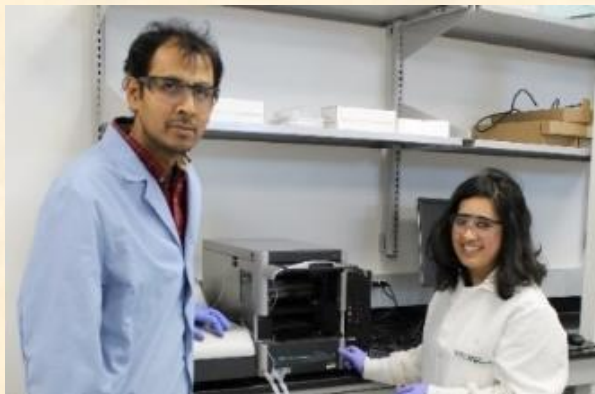


### ***Sensors Infrastructure Lab***



The purpose of this laboratory is to develop sensing technologies applicable in transportation infrastructure such as pavement and pipelines. The sensors used in this laboratory are capable of assessing different structural performance and parameters such as deformations, cracks, and temperature. Among the equipment available are an optical spectrum analyzer, a NI FBG integrator, optical power meters, tunable lasers, a fiber fusion splicer, and data loggers. In addition, this laboratory has isolated floor slab to minimize vibration in sensitive equipment, separate electrical grounding to reduce background signals, and dedicated bench spaces for research. This facility will help to support expanding research on infrastructure sensing technologies and will be available for students taking Introduction to Intelligent Infrastructure course. Current research in this lab include corrosion sensing in underground pipes and other transportation infrastructure. The faculty responsible for this laboratory is Assistant Professor Ying Huang.

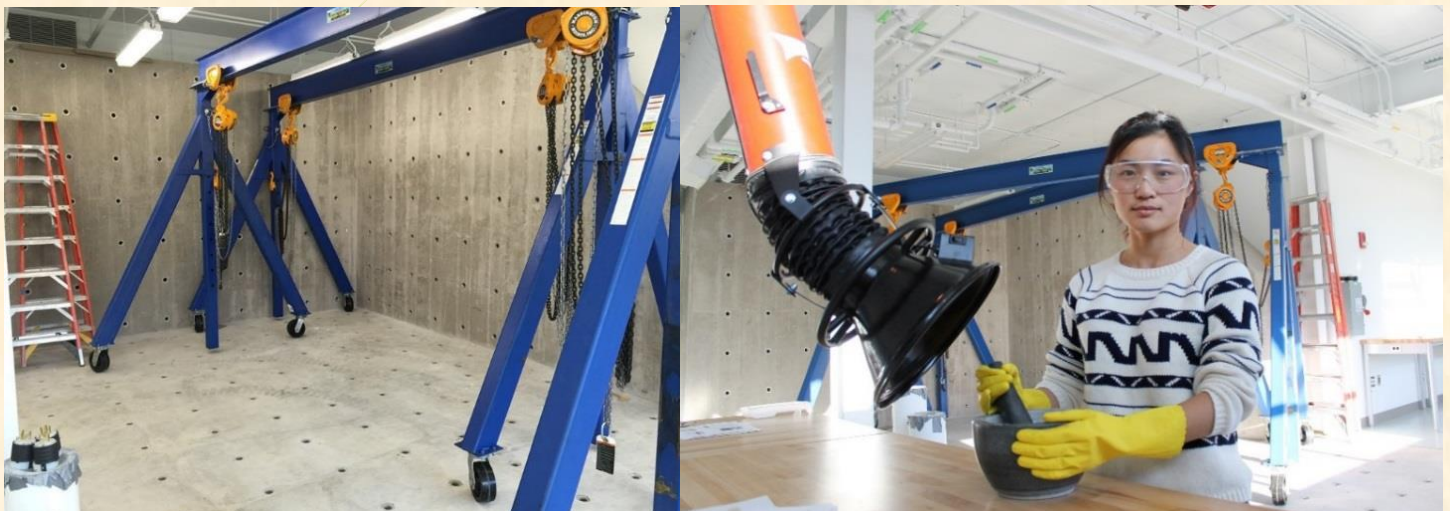
### ***Nano Impact Lab***



This laboratory is for conducting environmental nanotechnology research and available to students in Environmental Nanotechnology class. The laboratory is divided into three units: the main nanotechnology lab, a digestion room, and a plant cell culture lab equipped with a Class II Biosafety Cabinet. Some of the features of the Nano Impact Lab (NILab) are toxicity study tools, custom-made greenhouses, and dedicated bench space for batch and column studies. In addition, there is a new zetasizer system with capabilities to measure particles size, zeta potential, and molecular weight of proteins. Some of the equipment in the lab are purchased with federal grants. On-going research include application of nanomaterials for nutrient fortification in plants, toxicity of nanofertilizers on endemic bacteria, and fate of nanomaterials. The faculty in charge of the NILab is Dr. Achintya Bezbaruah.

### ***Geo/Structures Lab***

This laboratory is used for advanced structure and geotechnical research and in many Civil Engineering classes such as Stability of Structures, Foundation Engineering, and Advanced Soil Mechanics. Its capabilities and equipment include thick concrete strong wall and strong floor for large structure and seismic testing, a humidity-controlled walk-in environmental room, and a separate curing room. An exterior overhead door and a large crane are included for ease of large size sample handling. A shake table to simulate earthquakes will be soon added to the lab. Some other instruments that will be housed here are a universal testing machine, micro-hardness testers, and thermal analyzers. The faculty members responsible for the Geo/Structures Lab are Assistant Professors Mijia Yang, and Zhibin Lin, and Associate Professor Sivapalan Gajan.

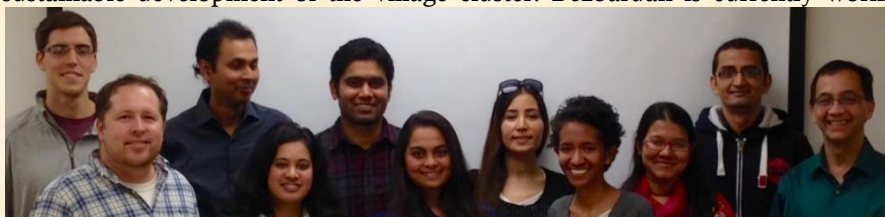


# CEE Scholarships

	Scholarship (Rotate within CoE)	2015-2016 Scholarship Recipient	
		Name	Hometown
1	J. DARRELL BAKKEN SCHOLARSHIP	Sarah Walker	Lino Lakes, MN
2	BARTLETT & WEST SCHOLARSHIP	Brandon Smith	Fargo, ND
3	WARREN DIEDERICH SCHOLARSHIP	Michael Hildreth	Embarrass, MN
4	RICHARD ENGER ENGINEERING SCHOLARSHIP	Emily Fassbender	Woodbury, MN
5	ARLAN GILBERTSON SCHOLARSHIP	Travis Olson	Minot, ND
6	GOODALL-SLOCUM MEMORIAL SCHOLARSHIP	Miranda Simon	Saint Augusta, MN
7	GOODALL-SLOCUM MEMORIAL SCHOLARSHIP	Logan Moir	Rochester, MN
8	GOODALL-SLOCUM MEMORIAL SCHOLARSHIP	Noah Schmidt	Rogers, MN
9	IRVIN JORDRE MEMORIAL SCHOLARSHIP	Jennifer Vanderheiden	Saint Michael, MN
10	JORGENSON CIVIL ENG SCHOLARSHIP	Matthew Suek	Fergus Falls, MN
11	GLEN MARTIN SCHOLARSHIP	Ryan David	Fargo, ND
12	MOORE ENGINEERING SCHOLARSHIP	Carissa Keller	Monticello, MN
13	JOHN OAKEY SCHOLARSHIP	Dylan Dunn	Fargo, ND
14	VERNE E. PLATH SCHOLARSHIP	Benjamin Quaas	Chaska, MN
15	ULTEIG ENGINEERING SCHOLARSHIP	Melissa Kuznia	Bismarck, ND
16	JEFFRY & JEANIE VOLK CIVIL ENG SCHOLARSHIP	Steven Giesler	Kulm, ND
17	E. WETTERSTROM SCHOLARSHIP-CIVIL ENG	Matthew Prochnaik	West Fargo, ND
18	JOHN & SUSAN BLOOM SCHOLARSHIP	Eric McDaniel	Bismarck, ND
19	PHYLLIS & ROBERT ANDERSON SCHOLARSHIP	Timothy Gleason	Devils Lake, ND
20	ASPHALT, INC SCHOLARSHIP	Gaven Mostenbacher	Brainerd, MN
21	LLOYD & VIRGINIA/NAPA THOMPSON SCHOLARSHIP	Kevin Doran	Fargo, ND
22	DUANE TRAYNOR CIVIL ENG SCHOLARSHIP	Matthew Lee	Dilworth, MN

## CEE's Global Classroom is 7,500 Miles Away!

Students in ECS 740 (Environmental Management) have successfully used a live case to learn the concepts of environmental management and prepared an "Action Plan for Sustainable Development of a Village Cluster in Goalpara District in the Northeast Indian State of Assam". The action plan also includes evaluation plans for the actions proposed. The course was offered by CEE Associate Professor Achintya Bezbaruah in Fall 2015. This class turned out to be a unique experience for the participants. They were able to use this class not only to learn the concepts of environmental management but also to give inputs for future sustainable development of the village cluster. Bezbaruah is currently working on possible implementation of a few of the actions/schemes proposed in the action plan.



The class coordinated their efforts through non-profits, local administration, and elected representatives. While this course did not have a formal textbook, the case study offered more than a book would have done.

# Giving to CEE

NDSU's Civil and Environmental Engineering Department welcomes contributions to support research, scholarships, and opportunities for undergraduate students, graduate students, and faculty members. Donations can be made through NDSU Development Foundation by one of the two methods:

**Method 1:** Please complete and mail the donation form (page-20) to the address given.

## Method 2:

**STEP 1:** Go to <https://www.ndsualumni.com/contribute>

Please specify your donation amount and select Designation as "Other" and write "Department of Civil and Environmental Engineering" (Other). Click on "Add Donation"

**Donation Information**  
If your designation is not listed, please select Other and enter the Fund Name.

Amount: \$

Designation:

Other:

**STEP 2:** Enter details of you donation and add a comment if you want the donation to go to Civil and Environmental Engineering (for example: **This donation is for Civil and Environmental Engineering Department**) and click "Continue"

**Donation Information**  
If your designation is not listed, please select Other and enter the Fund Name.

Amount: \$

Designation:

Other:

Amount:  Designation:

\$  \$0.00 Total

**Multiple/Split Gifts**  
*To add an additional donation or split your donation between two funds, enter an amount, choose the next fund from the list and click "Add Donation".*

Comments:

**STEP 3:** Please complete the rest of the process. Please contact NDSU Development Foundation if you have additional question.

We would appreciate if you kindly e-mail Interim Chair Dr. Dinesh Katti ([Dinesh.Katti@ndsu.edu](mailto:Dinesh.Katti@ndsu.edu)) notifying him of your donation, so that he can follow it up with an appropriate acknowledgment.

# Giving to CEE

Name(s): \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

My/our gift of \$ \_\_\_\_\_ is pledged and presented to the North Dakota State University Development Foundation.

This gift is designated for **Civil and Environmental Engineering Department**.

- **Cash:** Enclosed is a check to the “NDSU Development Foundation-Civil and Environmental Engineering Department Fund”  
for \$ \_\_\_\_\_.
- **Credit Card:** Please charge my gift of \$ \_\_\_\_\_ to my

VISA     DISCOVER     MASTER CARD

Account #: \_\_\_\_\_

Expiration date: \_\_\_\_\_

- Your signature: \_\_\_\_\_
- **Matching Gift:** Enclosed is a matching gift from my employer or my spouse's company.

Please mail this form to:

NDSU Development Foundation  
1241 N University Drive  
PO Box 5144  
Fargo, ND 58105-5144

A signature is required for credit cards.

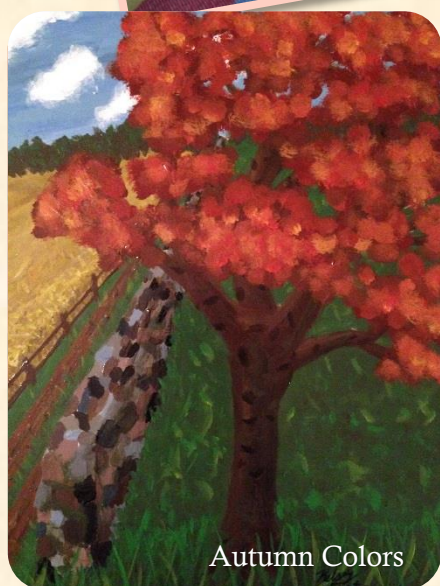
The NDSU Development Foundation is qualified to receive gifts, donations, and bequests that are deductible for federal income tax purposes.



Summer Stroll



Purple Iris



Autumn Colors

Art work by Civil and Environmental Engineering Senior **Kelsey Rose Fritze**. Kelsey has a busy schedule full with course work and CEE, CoE, and NDSU student organization activities. Yet she finds time to immerse herself into creative art work. Here are a few examples of a future civil engineer's colorful art work full of imagination.



Spring Day



Pink Tulip



The "Pink Tulip" was painted using watercolor pencils. The painting with the trees, flowering bush and bench along the path is called "Summer Stroll". Her painting "Purple Iris" is inspired by the irises that bloom each spring in her mom's garden. Kelsey painted "Spring Day" at NDSU campus. "Autumn Colors" (as well as "Purple Iris", "Summer Stroll" and "Spring Day") was painted on glass using a technique called layered glass painting

