

NEW 2014 San Diego Award Recipients

Outstanding Engineer (SDCEC)

Todd P. Coleman, Ph.D., UCSD Bioengineering Department



Dr. Todd Coleman's research philosophy tries to understand common links in sometimes seemingly disparate fields that provide a unique and compelling viewpoint. The main thrust of his research approach is centered around bridging the fields of information theory and control theory with biological disciplines to provide novel translational solutions. Feedback is central to how most biological as well as man-made physical systems operate effectively: it enables robustness to system uncertainties, adaptation to unknown disturbances, and usually significantly reduces complexity, energy, and other costs.

Information is a universal currency that is traded and processed in man-made, physical, and biological systems. Remarkably, wedding feedback and information theory – in a manner that can be predictive, constructive, beyond the realm of ontology – has not been explored in as much depth as one might imagine. Dr. Coleman strongly believes that understanding the central role played by feedback in information theory will not only provide more insight into fundamental limits and mechanisms that characterize healthy and diseased states in biological systems with complex dynamics.

As co-PI on the NSF IGERT grant on titled "Neuro-engineering: a unified educational program for systems engineering and neuroscience", Dr. Coleman was able to build a program with many faculty and students in neuroscience and engineering to address imaging, audition, and brain-machine interface clinical applications. Along with novel course development, one result of this collaboration led to Dr. Coleman's research group's developing design principles for brain-machine interfaces that espouse viewpoint of two agents (e.g. the brain and the external device) cooperating to achieve a common goal.

More recently, Dr. Coleman's team has developed a class of flexible bio-electronics that for the first time can bend with skin, are mechanically un-noticeable to the user, and can sense/actuate a variety of modalities and wirelessly transmit information.

Capabilities for non-invasive measurement of neural signals are important because they support many critical biomedical applications, including brain-machine interface paradigms in mobile applications. Currently, recording neural signals in mobile environments is a challenge because conventional measurement devices have rigid or mildly flexible construction and bulky cables for signal conduction. Technologies of the future must address these drawbacks, through new ideas that provide ultrathin, conformal designs, with high fidelity and non-invasive measurement modes. Dr. Coleman's research group, in conjunction with the research group of John Rogers at UIUC, is developing foldable, stretchable electrode arrays that can non-invasively measure neural signals (i.e. EEG) without the need for gel. The electrodes rely on layouts recently developed for silicon electronics that offer linear elastic responses to applied force, with the capacity to fold, twist and deform into various curved shapes. Stretchable electronics have the key advantage that they can wrap arbitrary, curvilinear surfaces and, at the same time, achieve mechanical properties that approach those of tissues of the human body (e.g. skin). These capabilities are especially significant for applications in skin-mounted devices for electroencephalography (EEG) in mobile environments.

Dr. Coleman was a distinguished speaker at a recent TedX conference in San Diego and was featured in San Diego Magazine's "people to watch issue" as one of the San Diegans most likely to have a significant impact on the San Diego community.

Outstanding Engineering Educator Award (SDCEC)

Dr. Janusz Supernak, SDSU



Dr. Janusz Supernak has been the CCEE Department Chair of San Diego State University for the past 18 years. He is a full-time professor of Civil Engineering in the area of Transportation Engineering which is the only such program in San Diego. His extensive work to support SDSU has brought in over \$4M in external funding. Dr. Supernak has authored over 100 publications (90% as first author) and H-index of 13 publications with at least 13 citations each. He was PI on the world's first Dynamic Congestion Pricing \$1.2M assessment project sponsored by FHWA on I-15 in San Diego. Enjoying international reputation in his field, Dr. Supernak was invited to the "Traffic and Transportation 2030" Congress to Darmstadt, Germany to deliver "USA Report" on behalf of the four invitees from the United States. He has lectured in 15 countries at such universities as Oxford University, Kyoto University, Hong Kong University, Delft University of Technology, Nanyang University, and Indian University of Technology, Chennai.

Dr. Supernak developed a new methodological framework for some of the travel demand models and led cutting-edge research effort in the area of ITS. In addition, Dr. Supernak contributed to ASCE's Vision of CE Education through his membership on the Executive Council of CE Department Heads, and he led three successful ABET evaluation cycles for the CCEE Department of SDSU. To best present the most important achievements in the field, he was involved in leading CE professionals in his Transportation classes at SDSU.

Dr. Supernak's exemplary work to assist in ASCE's strategic initiative, "Raise The Bar", is shown through his service of two terms (6 years total) on the National Executive Committee of the Civil Engineering Department Heads under the ASCE auspices in addition to serving as the SDSU ABET Coordinator for the last 18 years implementing the newest ASCE rules in the ABET accreditation process. He has been an active and dedicated member of ASCE since 1982. Dr. Supernak was recently honored as a Life Member. His dedication to ASCE includes being the proud Faculty Advisor of the ASCE SDSU student chapter since 1992. He attended all Pacific Southwest Conferences (PSWC) in the last 25 years and attended at least 15 regional leadership conferences (WSCL) with his ASCE student delegates. During his time as ASCE SDSU's Faculty Advisor, he helped organize at SDSU two Steel Bridge National Finals (1996, 2003) and one Concrete Canoe National Final. His extraordinary service to the student chapter includes supporting the strategic planning of this year's regional PSWC being hosted by ASCE SDSU.

Dr. Supernak pioneered a Summer Semester in Europe for SDSU Engineering students. This successful program completed six editions. He personally developed a model for that program, recruited students, delivered lectures, and led students' extracurricular activities in Europe. As President of the San Diego-Warsaw Province Sister City Society, Dr. Supernak arranged working personal meetings between the Governor of the Warsaw Province with SDSU students. SDSU is graciously proud to have an exemplary Faculty and Faculty Advisor who also has his own record recordings!

PROCLAMATION: 2014 National Engineers Week – San Diego

City of San Diego – Interim Mayor, Todd Gloria
San Diego County Board of Supervisors – Dianne Jacob, Chair

NEW 2014 SAN DIEGO AWARDS

San Diego County Engineering Council (SDCEC)

The SDCEC NEW 2014 Awards are:

OUTSTANDING ENGINEER: The award recognizes an engineer from the San Diego area who has made outstanding contributions to the field of engineering which serve the engineering profession and the general public. (SDCEC)

Todd P. Coleman, Ph.D.
UCSD

OUTSTANDING ENGINEERING EDUCATOR AWARD: The award recognizes an engineering educator from the San Diego area who has made outstanding contributions to the field of engineering education that serves the engineering profession and the general public. (SDCEC)

Dr. Janusz Supernak
SDSU

OUTSTANDING ENGINEERING PROJECT AWARD: The award recognizes an outstanding engineering project in the SD area that benefits the public. (SDCEC)

Santa Fe Bridge Pedestrian Undercrossing
San Diego Association of Governments (SANDAG)
City of Encinitas
T.Y. Lin International

Dr. Thomas Avolt Kanneman Outstanding Service Award (SDCEC)

Eric Kjolsing
UCSD Ph.D. Student in Structural Engineering



Mr. Eric Kjolsing is a Ph.D. student in UC San Diego's Structural Engineering Department. His research encapsulates the field of energy harvesting and structural health monitoring. He is currently working with the Los Alamos National Laboratory on the design of an energy harvester to be deployed in harsh environments. Mr. Kjolsing has spent more than three years as an Associate Bridge Engineer, first with T.Y. Lin International then Moffatt & Nichol. Major projects included the Port Mann Bridge in Vancouver, Ontario; the Cabrillo Bridge Retrofit in San Diego; the Veterans Memorial Bridge in Portland, Maine; and the South Milliken Avenue Grade Separation in Ontario, California.

Mr. Kjolsing believes the objectives of the engineering professional are threefold; educate the public on the role engineers play in society, mentor young engineers, and advance the state of the art. His service to the community over the past year include PE Review Course Instructor and E-Day at the Mall volunteer for the ASCE Younger Member Forum (YMF), JUMP Graduate Mentor at UC San Diego, and guest lecturer at Mira Mesa High School. His work at the Mira Mesa High School involved two teaching modules. The first module focuses on interviewing skills and resume. The second module introduces seismic design which is part of a capstone project developed where students design a structure to be seismically loaded on a mini-shake table.

As the current ASCE YMF Social Co-Chair, Mr. Eric Kjolsing encourages networking within ASCE YMF groups. In addition, he currently serves as the Membership Chair of the American Society for Engineering Education Student Division (ASEE SD). His mission is divided into two drives – development of a mentorship program whereby ASEE SD members are given the opportunity to be mentored by other ASEE division members and to make an impact on Universities where ASEE SD is not established by a marketing campaign to students.

**** Dinner Menu ****

Soda, Beer, Wine, or Mixed Drink served at check-in

Choice of Entree: Roasted Chicken, Roasted Wild Salmon, or Mushroom Ravioli

Whole Leaf Caesar Salad - Shaved Parmesan Cheese, Tom Croutons and Caesar Dressing

Served with
Rolls and Sweet Butter, and Freshly Brewed Coffee, Tea, or Decaffeinated Coffee

Apple Brown Butter Tart (vanilla cream and sliced apples carefully cupped in a buttery tart shell served with caramel sauce)

OR

Chocolate Mousse Cup (chocolate encompasses an elegant dark-chocolate cake carefully topped with whipped cream and chocolate shavings served with seasonal berry sauce.)

**OUTSTANDING CIVIL ENGINEERING PROJECT AWARD
(SDCEC/APWA)**

**Allison Avenue – A Complete and Green Street
City of La Mesa, Kimley-Horn & Associates**



The City of La Mesa and Kimley-Horn and Associates designed the Allison Avenue Complete and Green Streets project to be a state wide model for the implementation of Complete and Green Streets techniques in the City's main Civic corridor. To become a Complete and Green Street, Allison Avenue was taken from three lanes down to two lanes and included a variety of improvements to enhance pedestrian walkability and safety. These improvements positively impact a significant number of people in the community and the region through the implementation of the following:

- Mid-block crosswalk at bus/trolley transfer station
- Improved bus shelters
- Integration of vehicular travel and parking, light rail, buses, bicycles, and pedestrians
- Designed project around the current uses of the existing street now provides a safe and welcoming corridor leading from City Center to Commercial Downtown Area
- Vegetated swales utilizing existing and new landscaping to provide stormwater treatment
- Trench drains to avoid underground drainage
- Pedestrian friendly intersections serving the main City Civic Center corridor, including the city hall, fire station, library, police station, and post office
- Wide crosswalks and curb ramps
- Flashing mid-block crosswalks with infra-red touchless sensors
- Bulbouts for traffic calming and to shorten crossing distances
- 15 feet wide lanes to accommodate bicycles and angled parking
- New shorter ADA compliant connection from the corridor to the City building
- Improved decorative street and safety lighting and illuminated bus shelters

National Engineers Week (NEW) is always celebrated at the time of George Washington's birthday. Our nation's first president was a military engineer and a land surveyor. The purpose of NEW is to increase awareness of engineering's contributions to our quality of life as it unites engineers and the public in a celebration of innovation and technology.

This 63rd Anniversary of National Engineers Week was celebrated from February 16-22, 2014. This year the national NEW Committee has selected the Institute of Electrical and Electronics Engineers (IEEE) as the National Chair. NSPE serves as the headquarters for the national committee.

The local San Diego NEW 2014 Planning Committee involved over a dozen individuals representing over 10 San Diego organizations participating in the planning and projects. The San Diego County Engineering Council (SDCEC) sponsors NEW SD with representatives from over 20 societies, with society members from these and other societies serving on the local planning committee. The Institute of Electrical and Electronics Engineers (IEEE) is the local General Chair. The California Society of Professional Engineers (CSPE-SD) is the local Secretariat. The Chairs of the various committees for NEW 2014 San Diego are drawn from AIAA, ASCE, ASME, ASHRAE, CSPE, IEEE, NSBE, SEAOSD, SHPE and SWE.

The purpose of the events of NEW is to promote and celebrate the engineering profession through broad participation in NEW activities, which bring the engineering societies together in this effort, and to inform the general public about what engineering is and how it benefits society.

One of our goals is to get more young people informed and interested in engineering as a career. The Discover Engineering Mall Exhibit was held on February 22nd at the Grossmont Center Shopping Center. This year NEW SD 2012 societies co-sponsored the MATHCOUNTS San Diego competition, hosted by the University of San Diego on February 1st. Student competitions and other activities were planned at local universities (SDSU, UCSD, USD, City College, Mesa College).

The events and activities of the week are celebrated at the NEW SD Awards Banquet on Friday, February 28th at the University of San Diego, sponsored by USD Department of Engineering. A number of awards are presented to recognize the contributions of San Diego area engineers and others who contribute to engineering practice, education, technology, professionalism, society, and the San Diego community. A keynote speaker presentation concludes the banquet program.

NEW 2014 SAN DIEGO BANQUET PROGRAM KEYNOTE ADDRESS

**“Smart Skin Sensors and Analytics in the Cloud
to Advance the Frontiers of Wearable Health”**

KEYNOTE SPEAKER

We are elated to present our distinguished speaker, Dr. Todd P. Coleman, Associate Professor, Bioengineering at University of California at San Diego.

Dr. Coleman will discuss recent efforts by his research group in combining skin-integrated wearable sensors with multi-modal analytics algorithms that can be efficiently implemented in the cloud. The end result is a suite of human-computer interface applications that on the one hand, blur the distinction between man and machine, while on the other, promotes humans and computers playing to their individual strengths. Some examples will be provided within the context of perinatal health and chronic disease management.

Todd P. Coleman, Ph.D.

Todd P. Coleman received B.S. degrees in electrical engineering (summa cum laude), as well as computer engineering (summa cum laude) from the University of Michigan. He received M.S. and Ph.D. degrees from MIT in electrical engineering, and did postdoctoral studies at MIT in neuroscience. He is currently an Associate Professor in Bioengineering at UCSD, where he directs the Neural Interaction Laboratory and co-Directs the Center for Perinatal Health. His research is highly inter-disciplinary, lying at the intersection of bio-electronics, medicine, and machine learning. He is conducting research in wearable health by wedding his research group's expertise in large-scale analytics with their recent development of "epidermal electronics", featured in Science in 2011. Current applications of those synergies include perinatal health, chronic disease management, and cognitive monitoring during aging. Dr. Coleman is a science advisor for the Science & Entertainment Exchange (National Academy of Sciences) and his research has been featured on CNN, BBC, and the New York Times.