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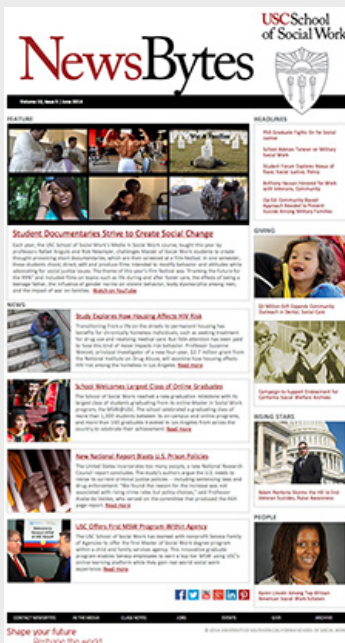
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Social Work and Engineering Researchers Join Forces

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by Charli Engelhorn

A mutually beneficial relationship between the disciplines of social work and engineering is not necessarily an obvious combination.



Shinyi Wu, center, shows USC School of Social Work researchers her work.

However, leaders from the USC School of Social Work and USC Viterbi School of Engineering believe collaboration between the two fields is a completely appropriate development.

“There is an organic relationship between social work and several other disciplines in a historical holistic perspective,” said Haluk Soydan, associate dean of research at the USC School of Social Work and director of the school’s Hamovitch Center for Science in the Human Services. “Engineering is about technical solutions and social work is about social solutions. When you come down to it, there are questions and areas of interest that make them close to each other.”

Soydan refers to this bridge between the disciplines as “social engineering,” a term first coined by Karl Popper to represent the methods used to find and apply solutions to social problems through the use of social technology. Yannis C. Yortsos, dean of the USC Viterbi School of Engineering, agrees with Soydan, stating that engineering’s contribution to the development of digital media has significant potential to promote the mission of social work.

“I define technology as exploiting phenomena for useful purposes—exploiting meaning collaborating and leveraging technology, taking something and making something else out of it,” Yortsos said. “I believe we will see a convergence with social phenomena, and disciplines like social work will borrow or implement or partner with technologies and ways of thinking that have an engineering aspect.”

The makings of this collaboration largely hail from a joint summit held last summer between the schools. The summit gave engineering faculty members the opportunity to discuss how they articulated the grand challenges of their profession and areas where crossover exists with social work.

Practical applications

Eric Rice, an assistant professor with the USC School of Social Work, attended that meeting and discovered interesting opportunities for partnerships concerning his work with homeless youth. After Rice found he shared mutual interests with Milind Tambe, the Helen N. and Emmett H. Jones Professor in Engineering who specializes in computer sciences, the two have been working together for the last eight months on developing an HIV prevention intervention for teens and young adults experiencing homelessness.

“I presented my work [at the summit] about risk behaviors for homeless youth, and Milind got excited because of my real-world information about networks,” Rice said. “He saw an opportunity to push his computational methods forward and solve real-world problems.”

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Rice's mapping of social networks among young people and Tambe's engineering perspective on strategy development came together well. The pair is now designing effective implementation strategies to see what works for the highly complicated and transient homeless youth population.

The data Rice collected through his research were sufficient to generate some suggestions to organizations working with this population, but without Tambe's contribution, he would not have had any concrete evidence to support his assessment. The collaboration, he said, elevated his research to a new level, allowing the researchers to provide advice backed by definitive evidence about what works and what doesn't regarding prevention interventions.

"Our hope is we will have a product that has very specific guidance for HIV prevention programming around effective strategies," said Rice. "It would be great to be able to go to an organization and say, 'This is likely a winning strategy that should be low cost and will work in the networks of this youth population.'"

Thanks to Tambe's computer science background, the duo will be able to use game-like modeling to assess their strategies without having to test them on people first. The next phase for Rice and Tambe will include working on a paper and grant applications during the coming year.

Benefits of big data

Soydan sees the use of computational science as a source of major potential for social work, especially in terms of large-scale datasets known as big data. In his new book, *Evidence-Based Practice in Social Work: Development of a New Professional Culture*, coauthored with colleague Lawrence Palinkas, the Albert G. and Frances Lomas Feldman Professor of Social Policy and Health, big data is described as having the potential to open up new horizons in the tracking of diseases and dysfunctions in society and to improve understanding of collective behavior patterns across national and cultural borders.

"Big data are contingent upon and compelled by advances in computational science," they wrote. "Collection and use of big data is now possible and can be done at a low cost."

Although the use of big data helps enable a wider perspective of human behavior, Yortsos believes social science still does not encompass the same level of determinism as the natural sciences. This lack of determinism makes the development of solutions more complicated.

"With better tools and better methods of sensing and collecting information and understanding through technology, we can find better laws than we have now," Yortsos said. "Social work will be helpful in making these laws not empirical, but more substantive."

This substantiveness, he continued, will be developed in part by the role of digital media in understanding and explaining phenomena. "What microscopes are to the natural sciences, digital media is to the social sciences," he said.

Potential partnerships

Yortsos pointed to a potential collaborative project with Hortensia Amaro, the Dean's Professor of Social Work and Preventive Medicine at the USC School of Social Work and associate vice provost of community research initiatives. Discussions have centered on the proximal community around USC and creative ways to transform the neighborhood.

Yortsos refers to this sort of topic as a useful purpose for the exploitation of technology. However, before an individual can capitalize on technology to address such a purpose, there must be an understanding of certain phenomena that can be leveraged to create change.

"By phenomena, I mean a law, principle, or some sort of fundamental property that change can be based on," Yortsos said. "In engineering, we have the skills to exploit technology, but we don't know what the useful purpose is when it comes to social work, and sometimes we don't know what the phenomenon is, which you need to discover before you can figure out the useful purpose."

Both departments see significant potential for future collaborations and are pleased with the progress made thus far. One notable achievement has been the transition of an engineering faculty member to the School of Social Work. Associate professor Shinyi Wu (see story on page 2) now holds a joint position with both departments after making the decision to join social work due to collaboration with Kathy Ell, the Ernest P. Larson Professor of Health, Ethnicity, and Poverty. Ell and Wu worked to find ways to use technology to improve support for patients with chronic illnesses, such as diabetes, chronic obstructive pulmonary disease, and heart disease.

“We saw a potential for technology to monitor and screen patients with depression and give that information to providers,” Wu said. “This is what really got me interested in public health and safety nets.”

Helping communities

Wu said the change to social work has afforded her the opportunity to focus more on solutions that benefit communities, something that was missing from the inherent human factors involved in engineering disciplines.

“The social determinants of community allow a person to be in the best supportive environment for solutions,” said Wu. “Working with Dr. Ell and [the USC Roybal Institute on Aging] allows me to bring analysis and interventions to communities to reduce the burden on the need for health care and get the appropriate help to those who need it.”

Through efforts at the Roybal Institute, Wu and her colleagues are working on a wireless-based mobile health training program for older adults with disabilities. They hope technology will help these individuals, who place a large demand on service providers, to better care for themselves, not just in terms of health but also productive living, meaning of life, and social connections with others.

Soydan said bringing Wu into the school is a pioneering first step that is important for the school’s ultimate mission: the betterment of life for individuals and communities.

“Research is not one person’s business—it’s a team business, and a team is defined as a multidisciplinary group of experts,” Soydan said. “Complex problems require multifaceted and aggressive approaches, and further collaboration between our disciplines has great potential and is in line with the spirit of the university and our school.”

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