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As the country braces for another wintery flu season, how cool would it be if your undershirt or socks not only kept you warm but also warned you about an oncoming infection, too?

A $400,000 National Science Foundation CAREER Award granted to Peter Lillehoj, assistant professor of mechanical engineering at Michigan State University, may soon make that a reality.

Lillehoj will spend the next five years advancing research on innovative wearable biosensors that can be used to detect illnesses and monitor health. Funding began Jan. 1, 2014.

“This technology will lead to lightweight and unobtrusive sensing systems that can be directly integrated onto fabrics and garments,” said Lillehoj.

One of Lillehoj’s overall goals for this project is to advance wearable sensor technology which is currently limited to measuring physiological parameters, such as heart and respiratory rates, and blood pressure.

“Little has been done to create wearable sensors for biomolecular detection. This research is aimed at developing wearable sensing systems that can detect biomarkers in secreted body fluids, such as sweat or urine.”

Lillehoj will also focus on developing textile batteries that are activated by body fluids for on-demand electricity generation. Based on this approach, the same fluids that are being detected could also power the device, minimizing its overall size and weight.

In addition to his research activities, he will also use the NSF CAREER Award to develop new courses and outreach programs that promote micro- and nanotechnologies for biomedical applications. Lillehoj said he hopes that more high school and college students become interested in this field as well as other STEM disciplines, preparing them for future educational training and careers in biomedical research.

“By creating diagnostics that are fast, low cost and noninvasive, we can do a better job of supporting preventive medicine through early disease detection,” he said. “Ultimately, this will reduce healthcare costs worldwide and offer low-cost diagnostics in places where resources are limited, such as developing countries.”

Lillehoj joined Michigan State in the fall of 2012 and becomes the 14th member of the MSU College of Engineering faculty to receive an NSF CAREER Award in the past five years.

He received three degrees in mechanical engineering: a B.S. from Johns Hopkins University (2006) and an M.S. (2007) and Ph.D. (2011) from the University of California, Los Angeles.

The Faculty Early Career Development (CAREER) Award is among the NSF's most prestigious honors, recognizing young faculty members who are effectively integrating research and teaching.

Related Website: Peter Lillehoj
NSF CAREER Award
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