



## Patented processes: 'The baby's not ugly, it just needs tweaking'



*Visiting Los Angeles are YSU I-Corps Team members, from left, graduate student Krishna Kundeti, Physics Professor Tom Oder and Dave Nestic, chief executive of TechBelt Energy Innovation Center, Warren.*

With two patented processes for improving semiconductors to his credit, YSU Physics Professor Tom Oder now has research to prove they're commercially viable – but they need a little tweaking.

Oder was principal investigator for a team that spent seven weeks introducing his semiconductor adaptations to potential business customers around the country – a \$50,000 I-Corps Team grant from the National Science Foundation paid their travel expenses.

Graduate student Krishna Kundeti, an Electrical Engineering major, served as the team's entrepreneurial lead; Dave Nestic, chief executive of TechBelt Energy Innovation Center in Warren, was team mentor.

After a few days of training, the team set out to interview more than 110 company engineers and scientists in the oil and gas, automotive, aerospace, military and space exploration industries. They crisscrossed Ohio and traveled as far as California.

"The NSF wants to see you base your conclusions not on your own theories, but on the actual need," said Oder. "If your product is useless – we say, if your baby is ugly – you want to find out early so you don't waste money." Then he added with a grin: "Our baby is not ugly. We just need to do some tweaking."

That means Oder and the student assistants working with him in his lab at Ward Beecher Hall will experiment with some of the changes that were suggested by scientists and engineers the I-Corps Team met. The ultimate goal, said Oder, is to form a company to market semiconductors for use in extremely high temperature and high voltage environments.

"Overall, it was an incredible experience working with Dr. Oder," Nestic said. "It was a very beneficial project, and I think it could be something very exciting for YSU if we go forward with investigating the commercial opportunities for his technology."

Unlike most NSF grants, which are typically used to fund laboratory research or purchase equipment, the I-Corps Team program pays to investigate the commercial potential of technology that was originally developed using NSF grant funds. Both of Oder's patented semiconductor technologies meet that criterion.

Oder, a Liberty Township resident, joined the YSU faculty in 2003. He was awarded YSU's first patent for the semiconductor treatment process in 2014, won a second patent for another process in 2015 and has been awarded more than \$750,000 in NSF grants.

He is native of Uganda, where he earned his undergraduate degree in physics and mathematics and a diploma in education from Makerere University. He holds a master's degree in Radiation Biophysics from the University of St. Andrews in Scotland, and a Fulbright Scholarship brought him to Auburn University, where he earned his PhD in Physics.

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