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Faculty Focus: Making a CAREER of It

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Making a CAREER of it

By Jennifer Tidball and Beth Bohn

The Faculty Early Career Development Program, or CAREER program, is the National Science Foundation's most prestigious awards program for junior faculty who have the potential to serve as academic role models in research and education and to lead advances in the mission of their department or organization. According to the NSF, activities pursued by CAREER award winners should build a firm foundation for a lifetime of leadership in integrating education and research.

That promise is holding true at Kansas State University, where several recent recipients of the award say it has helped boost and solidify their careers.



Christine Aikens,
professor of chemistry

2010 CAREER award recipient

1. WHAT ARE YOUR CURRENT RESEARCH INTERESTS?

My research focuses on understanding chemical and physical properties of nanoparticles in their ground and excited states.

2. HOW HAS YOUR RESEARCH PROGRESSED SINCE RECEIVING THE CAREER AWARD?

The CAREER award enabled us to examine catalysis on metal oxide clusters. Our group also studies noble metal nanoparticles. Recently, we have started to put the two areas together to examine factors involved in plasmon-enhanced photocatalysis.

3. HOW HAS THE CAREER AWARD BENEFITED YOUR WORK?

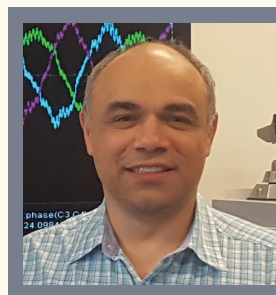
The CAREER award allowed us to study a different area from the noble metal nanoparticles that we had been studying to that point.

4. WHAT ADDITIONAL GRANTS HAVE YOU RECEIVED?

We have received additional funding from the National Science Foundation for studying chemical reactivity and excited state dynamics of gold nanoparticles; funding from the Department of Energy for studying plasmon-enhanced photocatalysis; and funding from the Air Force Office of Scientific Research for studying excited states in silver nanoparticle assemblies.

5. WHAT IS YOUR BIGGEST ACCOMPLISHMENT SINCE EARNING THE CAREER AWARD?

I am proud of the five doctoral students who have finished in the last four years. They are truly our group's biggest accomplishment. Each of them has multiple publications, which represents new contributions to scientific knowledge.



Behrooz Mirafzal,
associate professor of electrical and computer engineering and Michelle Munson and Serban Simu keystone research scholar

2014 CAREER award recipient

1. WHAT ARE YOUR CURRENT RESEARCH INTERESTS?

My current research focus is on advanced energy conversion systems, power electronics for microgrids and on-the-move technologies.

2. HOW HAS YOUR RESEARCH PROGRESSED SINCE RECEIVING THE CAREER AWARD?

The NSF CAREER award provides more visibility in the power electronics society as not many early academic career investigators in the field of power electronics have received this award.

3. HOW HAS THE CAREER AWARD BENEFITED YOUR WORK?

I have done many new activities in research, teaching and university/college/department services.

4. WHAT ADDITIONAL GRANTS HAVE YOU RECEIVED?

I have received several small grants from NSF and local industry, but I have established several multi-university-industry collaborative research activities in which K-State has been the lead institution. I am currently working on an NSF industry-university cooperative center, called COMET, the Center for On-the-Move Energy Technologies. I have also established a collaborative project with European scientists as a direct result of my CAREER award.

5. WHAT IS YOUR BIGGEST ACCOMPLISHMENT SINCE EARNING THE CAREER AWARD?

The power electronics research group at K-State has become established and recognized by other research groups outside of the university.



Gurpreet Singh,
Harold O. and Jane C. Massey
Neff professor of mechanical
engineering

2015 CAREER award recipient

1. WHAT ARE YOUR CURRENT RESEARCH INTERESTS?

Presently, research in our lab is focused on 2-D materials and composite materials composed of 2-D materials with precursor-derived ceramics. We are studying these materials for applications in rechargeable batteries and high temperature applications.

2. HOW HAS YOUR RESEARCH PROGRESSED SINCE RECEIVING THE CAREER AWARD?

Research on flexible electrodes on 2-D materials, such as graphene and transition metal dichalcogenides, has flourished since the CAREER award. We have published two high-impact papers in Nature Communications and Scientific Reports that have already picked up approximately 100 citations.

3. HOW HAS THE CAREER AWARD BENEFITED YOUR WORK?

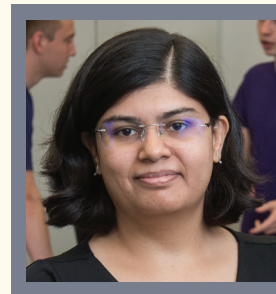
The CAREER award has provided increased visibility of research in our lab, access to better students and the opportunity to collaborate with leaders in the field.

4. WHAT ADDITIONAL GRANTS HAVE YOU RECEIVED?

I have received two additional grants. One grant is \$5 million from the National Science Foundation Partnerships in International Research and Education to study “Making ceramic fibers and high temperature composites from polymeric precursors.” The other \$170,000 grant is from OneSubSea for “Investigation of graphene oxide coating for protection against seawater corrosion.”

5. WHAT IS YOUR BIGGEST ACCOMPLISHMENT SINCE EARNING THE CAREER AWARD?

Our biggest accomplishment is the ability to produce large quantities of 2-D materials — graphene oxide and transition metal chalcogenides — to make large flexible battery electrodes for high-capacity lithium-ion batteries and sodium-ion batteries. More recently, we have demonstrated the ability to produce hybrids of 2-D materials with polymer-derived ceramics. This is an exciting area and would allow us to manufacture high-performance multifunctional composites at a low cost using additive manufacturing techniques.



Pavithra Prabhakar,
associate professor of computer science
and Peggy and Gary Edwards chair in
engineering

2016 CAREER award recipient

1. WHAT ARE YOUR CURRENT RESEARCH INTERESTS?

My research interests are broadly in the area of applying rigorous and automated techniques for design and analysis of software that control safety-critical physical systems, such as software in autonomous cars and aircraft.

2. HOW HAS YOUR RESEARCH PROGRESSED SINCE RECEIVING THE CAREER AWARD?

Receiving the CAREER award has helped me jump-start my research at K-State. I have been able to establish the hybrid control systems group that consists of postdocs, doctoral students and undergraduate students.

3. HOW HAS THE CAREER AWARD BENEFITED YOUR WORK?

The award has had a direct impact on research by our group on stability analysis for complex control software. We have developed a novel algorithmic framework and software tools that have been published in top venues such as the International Conference on Computer Aided Verification, Embedded Systems Conference and the International Conference on Hybrid Systems: Computation and Control.

4. WHAT ADDITIONAL GRANTS HAVE YOU RECEIVED?

I have also received a young investigator award from the Office of Naval Research for work on automated control design for autonomous underwater vehicles.