VENUGOPAL K. VARMA

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### Professional Experience

**2016 to Present**

G*roup Leader, Remote Systems Group, Fusion Energy Division, Oak Ridge National Laboratory, Oak Ridge, TN*

Lead a group of 16 engineers, technicians, and designers in developing mechanical systems for high-radiation environments. Develop actuator controls for three different systems for the Transformational Challenge Reactor project. Work on spent fuel cask disposition methodologies, Molten Salt Reactor remote handling, ultrasonic thermometry development, ORNL’s Mobile Uranium Facility, and new generative design methods for mechanical components. Developed an Octocopter for eco-sampling of the terrestrial biosphere.

**2006 to 2016**

*Senior Research Engineer, Remote Systems Group, Nuclear Science and Technology Division, Oak Ridge National Laboratory, Oak Ridge, TN*

Main projects were: Mobile Uranium Facility, Strategic Defense Stockpile, and Material Plasma Exposure eXperiment (Target Station design). Also involved in development of a new Advanced High Temperature Reactor design, and the design, layout, and inspection of a Pu-238 processing facility. Estimated the carbon capture potential of algae and developed a viable model for co-locating algal cultivation near power plants. Led a $1.3 million research and development effort for the detection of stress corrosion cracks in natural gas pipelines using a custom-built Electro Magnetic Acoustic Transducer. Led the mechanical engineering design effort for instrumenting an ultrasonic-level sensor. Involved in the development of tools for forming high-pressure glass beads for use in a novel radiation sensor design. Developed new remote instruments (i.e., titrator/pipettor) for operation in a hot cell. Developed instrumentation and controls for a new reconfigurable glove box design. Involved in development of 3D models of mercury flasks in US Department of Defense inventory to assess their integrity for long-term storage. Involved in development of numerous remote viewing platforms for hazardous environment.

**1999 to 2005**

*Development Staff II, Remote Systems Group, Nuclear Science and Technology Division, Oak Ridge National Laboratory, Oak Ridge, TN*

Developed a new shape memory alloy actuator with DARPA funding. Developed a meso-scale piezoelectric actuator with internal funding. Developed many tools for nuclear remediation and reactor dismantlement. Involved in development of remote tools for the Spallation Neutron Source experimental facility.

**June 1993 to 1998**

*Development Staff I, Robotics and Process Systems Division, Oak Ridge National Laboratory, Oak Ridge, TN*

Involved in development of control algorithms for robot manipulators using kinematics, dynamics, and control systems. Developed a real-time robotics simulation on IGRIP with joystick control, as well as tools for the remote operation of nuclear clean-up. Other projects involved automation of material handling equipment for the US Army, vision-based identification of components, and computer-assisted autodocking of vehicles.

**July 1983 to April 1984**

*R & D Engineer, National Engineering Company, Madras, India*

Responsible for testing and commissioning a new reaper unit.

### Education

 **Doctor of Philosophy** in Mechanical Engineering

*University of Maryland, College Park* (January 1993)

Dissertation*: Robot Grasping: Optimization and Stability Issues*.

**Master of Science** in Mechanical Engineering

*University of Maryland, College Park* (Fall 1990)

Scholarly Paper: *Calibration of Stereo Cameras*.

**Master of Science** in Agricultural Engineering

*Colorado State University, Fort Collins* (Summer 1986)

Thesis: *Design and Analysis of a Computer-Based Hydraulic Draft Control System.*

**Bachelor of Technology** in Agricultural Engineering

*Indian Institute of Technology, Kharagpur, India* (1978 to 1983)

Research Project: *Performance Evaluation of Windmill Rotor Blades for Varying Blade Cross-Sections.*

**Management Training**

Management Boot Camp (ORNL) 2016

Managing in a technical environment (UT College of Business Administration) 2008

### Publications

Over 55 publications in technical journals, conferences, and technical reports covering

the areas of robotics, computer vision, automation, and design for remote environment.

**Professional Activities**

Adjunct Professor, Mechanical Engineering Department, University of Tennessee, Knoxville.

Member of ASME and IEEE.

Member of Phi Kappa Phi Honor Society.

## Patents

* “Shape Memory Alloy Actuator”, V.K. Varma, US 6,272,857 B1, Aug. 14, 2001.
* “Multi-Range Force Sensor Utilizing Shape Memory Alloys”, V.K. Varma, US 6,546,806 B1, Apr 15, 2003.
* “Interface Gasket for Building Envelope Penetrations”, Aaron, A., Bhandari, M., and Varma, V., elected for patent filing 6/25/2020
* “Ultrasonic waveguide for improved ultrasonic thermometry”, Cetiner, N., Cetiner, S., Govindarajan, M., Muth, T., Montgomery, R., and Varma, V., patent filed on 8/21/2020

**Awards**

* Received silver medal awarded to students who graduated first in the department at I.I.T. Kharagpur, India (1983)
* Received honorable mention from *Pattern Recognition Journal* for a manuscript judged to be among the most original published in 1994 (21st Annual Society Award)
* Awarded the Secretary of Energy's Achievement Award —Secretary's Honor Awards program for being part of the Emerging Threats team, 2018

**Editorial Board**

* International Journal of Advanced Robotic Systems

## Computer Languages

* C, Fortran, Visual Basic
* Other tools: MATLAB, Mathematica, ProE, IGRIP, PolyWorks, LabView, SolidWorks