OKLAHOMA SCHOOL OF SCIENCE AND MATHEMATICS

Oklahoma stands out among other states in our dedication to providing extraordinary academic challenge in science and mathematics education to our gifted students at a time when our nation falls behind other countries in these areas.

With just 25 classes graduated, OSSM alumni/alumnae are already bringing substantial benefits to our state as they complete their degrees and move into their professions.

- **Eighty-five percent of OSSM alumni are remaining in scientific, technology, engineering, and mathematics (STEM) fields for their careers!**
- The fields of study and careers most chosen by OSSM graduates are engineering (aerospace, biomedical, chemical, civil, computer, electrical, mechanical, petroleum); medicine, medical research, and other health sciences; and other fields including computer science, technology, education, scientific research, business, and law.
- Many OSSM alums are employed in many of Oklahoma's finest corporations, hospitals and technical firms such as AT&T, Artificial Lift Company, Baptist Hospital, Benham Companies, Boeing, Cardinal Engineering, Chesapeake Energy, Chevron Phillips, Devon Energy, Ditch Witch, Dobson Communications, FAA, Guernsey, Hall Estill, LexisNexis, Mercy Hospital, MidFirst Bank, OG&E, Oklahoma Cardiovascular Associates, Oklahoma Center for Neuroscience, Oklahoma Heart Hospital, Oklahoma Medical Research Foundation, Oklahoma State Bureau of Investigation, the *Oklahoman*, SAIC, St. John Hospital, Standard Aero, Stillwater Medical Center, Tinker Air Force Base, University of Oklahoma and OU College of Medicine, University of Tulsa, World Telemetry, and many more.
- A full fourth of Tulsa's most successful start-up companies highlighted in 2012 by the *Tulsa World* were begun by OSSM alumni.
- Of the more than 100 students who have earned M.D. degrees (another 100 are currently in medical school), more than half have done so in Oklahoma medical schools.
- OSSM students are actively recruited by the finest universities, colleges and technical institutes from across the states; however, more than half choose to pursue their higher education in Oklahoma.
- Some 60% of OSSM graduates are living/working in Oklahoma.

OSSM
Senator Penny Williams Distinguished Lecture Series
Presents

Geoffrey S.D. Beach, Ph.D.

ASSOCIATE PROFESSOR OF MATERIALS SCIENCE & ENGINEERING
PRINCIPAL INVESTIGATOR, BEACH GROUP LABORATORY FOR NANOMAGNETISM AND SPIN DYNAMICS
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
(OSSM CLASS OF 1993)

"Sculpting with Atoms: Designing Materials to Solve Emerging Problems"

March 30, 2017

Kirkpatrick Auditorium
Oklahoma School of Science and Mathematics

GEOFFREY S.D. BEACH, PH.D.

B.S., Physics, California Institute of Technology, 1997
Ph.D., Physics, University of California-San Diego, 2003
Postdoctoral Fellow, University of Texas at Austin, 2003-2008
Associate Professor, Department of Materials Science & Engineering &
Chair of Undergraduate Studies
Massachusetts Institute of Technology
Primary Investigator, The Beach Group

Professor Geoffrey Beach worked in UCSD's Center for Magnetic Recording Research to develop novel magnetic thin-film nanocomposites for ultrafast data storage applications. He later went on to the University of Texas at Austin as a Postdoctoral Fellow in the Department of Physics and the Texas Materials Institute where he made important discoveries in magnetization dynamics and spin-transfer torque in nanoscale magnetic structures. His current research interests focus on spin dynamics and "spin-electronics" in nanoscale magnetic materials and devices.

In 2008 Dr. Beach joined the MIT Faculty as an Assistant Professor in the Department of Materials Science and Engineering. At MIT, he directs the Laboratory for Nanomagnetism and Spin Dynamics, which designs advanced materials for spin-based memory, logic, and emerging applications. Developing ways to store information more densely and to access it more quickly requires understanding the magnetization configurations in nanoscale structures and how they evolve in time. His work aims in part to understand and control spin excitations in magnetic materials whose dimensions approach fundamental magnetic length scales. One of the most exciting prospects in magnetism today is the possibility of electrical control of the magnetic state of a device, taking advantage of the coupling between spin and charge in a conducting ferromagnetic material.

A major thrust of his research aims to harness the spin of the electron in magnetic materials to realize new approaches to spin-based storage and computation. Studying these processes requires the development of advanced instrumentation capable of probing magnetization dynamics at the shortest timescales and the smallest length scales.

His group will work to develop new optical and electrical approaches to push the detection limits in order to enable development of new materials and structures to meet the information storage and processing demands of the future.

Dr. Beach has published more than 70 research papers and presented more than 80 invited talks around the world. His work has been recognized with numerous awards including most recently a Deshpande Center Award for Technological Innovation, the MIT Junior Bose Award for Excellence in Teaching, the MIT Class of 1958 Institute Chaired Professorship, and the Department of Energy (DoE) Early Career Award.

SENATOR PENNY WILLIAMS DISTINGUISHED LECTURE SERIES

Senator Penny Williams, Tulsa, former Chair of the Senate Education Committee as well as the Legislative Arts Caucus, has been a leader in education, science and technology, and arts and humanities issues in the Oklahoma legislature. After serving four terms in the State House of Representatives, she was elected to the State Senate in 1988 where she served until 2004. In 1983, then State Representative Williams introduced House bill 1286 which created the Oklahoma School of Science and Mathematics. Marshaling co-authors and battling for scarce funds, her tireless advocacy secured the passage of the bill and continuing support of OSSM.

In appreciation for the far-sighted vision of this special public servant, and in tribute to her role as the sine qua non of OSSM, her friends and friends of the school have created and begun the endowment of these lectures that will bring national and international figures in the arts and sciences to the Oklahoma School of Science and Mathematics. The contribution of ideas of speakers like Dr. Judith James to our state's intellectual milieu is the greatest and most appropriate gratitude that we can offer Senator Williams.

WELCOME & INTRODUCTION OF SPECIAL GUESTS

Dan Little, Esq.
Chairman, Board of Trustees, Oklahoma School of Science and Mathematics

INTRODUCTION OF DR. BEACH

Daniel Yao
OSSM Class of 2017 (Edmond Santa Fe High School)

LECTURE

Geoffrey S.D. Beach, Ph.D.

CLOSING

Frank Y. H. Wang, Ph.D.
President, Oklahoma School of Science and Mathematics

SPECIAL THANKS TO
THE ZARROW FOUNDATION * MR. RALPH SPENCER