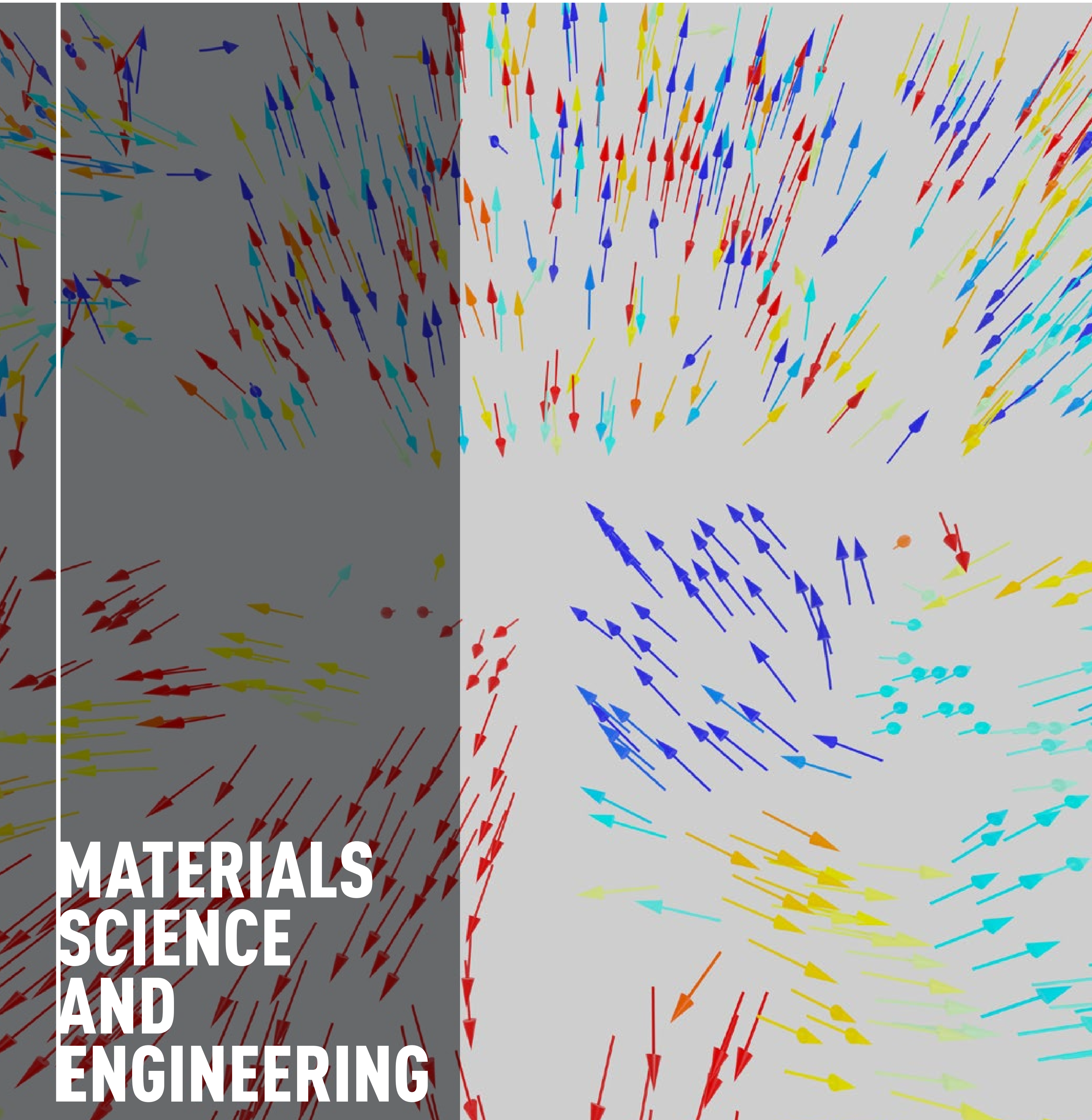
THE
JONSSON SCHOOL

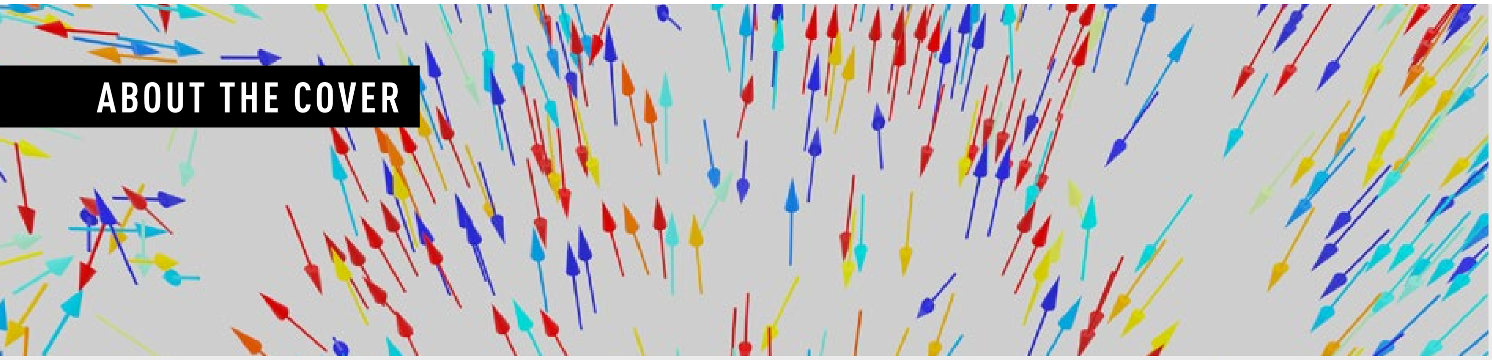
2021



MATERIALS SCIENCE AND ENGINEERING

THE UNIVERSITY OF TEXAS AT DALLAS

ABOUT THE COVER



Researcher Dr. William Vandenberghe and his team recently discovered five kinds of magnetic orders in monolayers of transition-metal dichalcogenides (TMDs). The cover illustrates the magnetization of manganese, iron, chromium, vanadium and cobalt dopants in a monolayer of tungsten diselenide where the color indicates the degree to which the magnetization points out of the plane. The discovery and findings for a total of 45 material/dopant combinations were published May 2021 in the *Nature* partner journal on two-dimensional materials *npj 2D Materials and Applications*.

Vandenberghe joined The University of Texas at Dallas in 2016 and will be promoted to associate professor of materials science and engineering in fall 2021. He is an expert in the theoretical study of electronic transport with a focus on novel materials, and his research spans from first principles calculations of materials properties to quantum and semiclassical device simulations. Applications include nanoelectronics and photovoltaics.

He received the 2014 Katholieke Universiteit (KU) Leuven Research Council Award and the 2018 Young Investigator Award from the Defense Threat Reduction Agency (DTRA). He is the co-author of *Advanced Physics of Electron Transport in Semiconductors and Nanostructures*, a physics graduate text, and has authored or co-authored more than 100 publications in international journals and conference proceedings. His research is sponsored by the National Science Foundation, DTRA, Texas Instruments Inc., Intel Corp., TSMC and the Semiconductor Research Corp.

Vandenberghe is also the general chair of this year's IEEE International Conference on Simulation of Semiconductor Processes and Devices (SISPAD 2021). SISPAD provides a forum for leading research in the area of process and device simulation and is one of the longest-running conferences devoted to technology computer-aided design and advanced modeling of novel semiconductor devices and nanoelectronic structures.

MSE FAST FACTS 2020

29 **Faculty**

- **13** Tenure Track Full Faculty
- **1** Non-Tenure Track Faculty
- **3** Emeritus Faculty
- **12** Adjunct/Courtesy Faculty

10 **Elected Professional Fellows**

4 **Shared Research Facilities**

- Cleanroom Research Laboratory
- Nanocharacterization Facility
- Surface and Materials Characterization Laboratory
- Materials and Surface Technology Resource Lab

>100 **Peer-Reviewed Publications**

59 **Enrollment**

52 PhD **7** MS

$4.5M **Annual Research Expenditures**

DEPARTMENT HEAD'S WELCOME

Dear MSE Friends and Alumni,

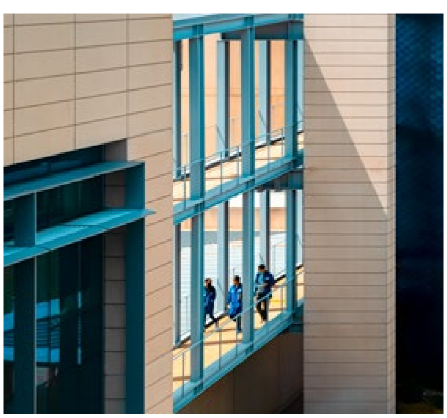
First and foremost, I wish you and your family a safe return to our pre-pandemic normality. The huge success of vaccinations and the associated technology demonstrated how important science and technology are for humanity. We look forward to returning to regular teaching, research and service as soon as fall 2021.

We are very proud of how the MSE faculty, staff and students adjusted to working remotely, while maintaining high productivity and academic performance. The pandemic simply made us more innovative and creative. Even with the challenges associated with remote working, these past few months have been a great success for the department. Our faculty continue to receive multiple awards, our students are recognized with fellowships and our alumni advance in their careers. More details inside this newsletter.

The future for MSE at UT Dallas appears promising. We continue to conduct internationally recognized research, while providing a great academic experience for our students. This year, the Department of Materials Science and Engineering will establish the MSE Founders Fellowship in honor of our three founders: Dr. Bruce E. Gnade, Dr. Moon J. Kim and Dr. Robert M. Wallace to support new outstanding MSE graduate students who contribute to a culture of academic excellence and community engagement. Please join us in supporting the MSE Founders Fellowship to continue their vision and legacy. There will be more exciting news from MSE in the next few months. Stay tuned.

Best regards,

Dr. Manuel Quevedo
Professor, Materials Science and Engineering
Head, Materials Science and Engineering



ON THE BACK COVER:
MSE faculty and staff worked throughout the COVID-19 pandemic to ensure research continuity. The Natural Science and Engineering Research Laboratory (NSERL) building features a walkway to the Bioengineering Sciences Building (BSB).

DEPARTMENT HEAD
Dr. Manuel Quevedo

ASSISTANT DIRECTOR
Tonya Griffin

EDITOR
Laura Schmidt

DESIGNER
Kurt Mansor

CONTACT US
Department of Materials Science and Engineering
The University of Texas at Dallas
800 West Campbell Road, RL10
Richardson, TX 75080

AUCIELLO RECOGNIZED AS A MARQUIS WHO'S WHO TOP SCIENTIST

Congratulations to Dr. Orlando Auciello, who has been selected to receive the Albert Nelson Marquis Lifetime Achievement Award. The award identifies luminaries who have achieved notability based on positions of responsibility and contributions to their field of inquiry. This award is the highest honor extended by publisher Marquis to only 5% of their base, including approximately 1.4 million scientists worldwide.

Auciello, Distinguished Chair in Engineering and professor of materials science and engineering and bioengineering at The University of Texas at Dallas, has been recognized by Marquis *Who's Who Top Scientists* for dedication, achievements and leadership in the field of physics.

With unique specializations in physics, materials science and fusion energy, he is the founder of three companies including Original Biomedical Implants, which is based within the University's Venture Development Center. He was named an Outstanding Inventor by the U.S. Department of Energy in 1991. Auciello also earned distinction as a scientist at the Argonne National Laboratory, a materials scientist at the Microelectronics Center of North Carolina and in multiple roles at academic institutions.

Auciello's interest in his profession began after he read an article by Albert Einstein, which left him in awe of the universe and eager to make discoveries. Throughout the course of his career, he has served as an editor of *Plasma-Materials Interaction* and in similar capacities with journals including *Applied Physics Letters* and *Integrated Ferroelectrics*. Auciello is proudest to have developed ultrananocrystalline diamond (UNCD) coating technology that enables revolutionary industrial, high-tech and medical products.

Auciello graduated from a top military school of Argentina, with the highest grade

as a bachelor's degree holder and reserve lieutenant in the Army. He attained a diploma in electronic engineering from the University of Cordoba, then continued his studies at the University of Cuyo in San Carlos de Bariloche, Argentina, where he obtained summa cum laude MS and PhD degrees in physics.

In recognition of his enduring contributions, Auciello was elected as a fellow of the American Association for the Advancement of Science and the Materials Research Society. Outside of his vocational circles, Dr. Auciello enjoys drawing and painting.

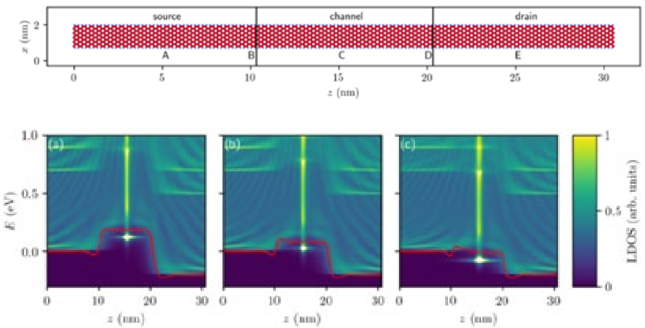
QUANTUM TRANSPORT SIMULATION OF GRAPHENE-NANORIBBON FIELD-EFFECT TRANSISTORS WITH DEFECTS

Dr. Massimo (Max) V. Fischetti is a Texas Instruments Distinguished Professor in Nanoelectronics and professor of materials science and engineering in the Department of Materials Science and Engineering. Before joining The University of Texas at Dallas, Fischetti worked at the IBM Thomas J. Watson Research Center and as a professor at the University of Massachusetts Amherst.

Fischetti is currently leading a research group focusing on the electronic structure and transport in nanometer-scale structures and devices. As an expert in physics, he studies the behavior of electrons at the smallest scales. He currently studies materials such as graphene, or graphite engineered into a sheet of carbon atoms.

Fischetti's group focuses on the continuing scaling of the dimensions of the transistors used in electronic devices that have shaped human life in the past decades. As these transistors have shrunk from micrometers in the 1970s to nanometers in the 2010s, the physics that control the transport of electrons in semiconductors have become increasingly complex.

Electronic transport in larger semiconductor devices can be studied using simplifying assumptions that are valid in large devices. In particular, researchers assume incoherent semiclassical transport, a theory amenable to the Boltzmann equation, which describes the statistical behavior



Top: Atomic structure of a transistor based on graphene nanoribbons. **Bottom:** The local density of the electronic states that determine the current flowing in the device in the presence of a defect that may possibly result from imperfections during the manufacturing process. Images published in "Quantum transport simulation of graphene-nanoribbon field-effect transistors with defects," *The Journal of Computational Electronics* by Shanmeng Chen, Maarten L. Van de Put and Massimo V. Fischetti.

of a kinetic thermodynamic system. They also assume a bulk-like electronic structure of the conductive channel, an assumption which permits the use of either the effective-mass approximation or of a full-band electronic structure but still bulk description. Neither of these assumptions is valid for the study of electrons under five nanometers.

With novel materials such as 2D materials and topological insulators, increasingly small sizes of devices, strong quantum-confinement effects and the likelihood of quasi-coherent transport, researchers who study electron transport at the nanoscale require major changes in their theoretical approach. Fischetti's research proceeds on three fronts in order to tackle these advanced problems: band-structure calculations using density-functional theory and empirical pseudopotentials, semi-classical electronic transport using Monte Carlo simulations, which is a technique designed to estimate outcomes of an uncertain event, and quantum transport based on empirical pseudopotentials.

Fischetti has published more than 250 journal or conference proceedings articles with more than 17,000 citations. He was elected Fellow of the American Physical Society and received the IEEE Cledo Brunetti Award in 2011.

RESEARCH ADVANCES EMERGING DNA SEQUENCING TECHNOLOGY

Dr. Moon Kim, Louis Beecherl Jr. Distinguished Professor in the Erik Jonsson School of Engineering and Computer Science, and fellow researchers developed a nanopore-sequencing platform that for the first time can detect the presence of nucleobases, the building blocks of DNA and RNA.

Nanopore technology shows promise for enabling the development of small, portable, inexpensive devices that can sequence DNA in real time. One barrier researchers must overcome is improving the accuracy of the technology.

Researchers at The University of Texas at Dallas have advanced this goal by developing a nanopore-sequencing platform that can detect the presence of nucleobases, the building blocks of DNA and RNA. The study was published online Feb. 11 and is featured on the back cover of the April print edition of the journal *Electrophoresis*.

"By enabling us to detect the presence of nucleobases, our platform can help improve the sensitivity of nanopore-sequencing," said Dr. Moon Kim, professor of materials science and engineering and the Louis Beecherl Jr. Distinguished Professor in the Erik Jonsson School of Engineering and Computer Science.

Currently, most DNA sequencing is done through a process that involves preparing samples in the lab with fluorescent dye and using lasers to determine the sequence of the four nucleobases, the fundamental units of the genetic code: adenine (A), cytosine (C), guanine (G) and thymine (T). Each nucleobase emits a different wavelength when illuminated, allowing scientists to determine the sequence.

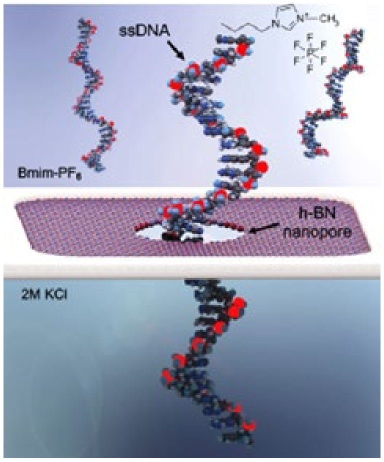
In nanopore-sequencing, a DNA sample is uncoiled, and the hairlike strand is fed through a tiny hole, or nanopore, typically in a fabricated membrane. As it moves through the nanopore, the DNA strand disturbs the electrical current flowing through the membrane. The current responds differently based on the characteristics of a DNA molecule, such as its size and shape.

One of the challenges in advancing nanopore-sequencing has been the difficulty of controlling the speed of the DNA strand as it moves through the nanopore. The UT Dallas team's research focused on addressing that by fabricating an atomically thin solid-state — or nonbiological — membrane coated with titanium dioxide, water and an ionic liquid to slow the speed of the molecules through the membrane.

The next step will be to advance the platform to identity each nucleobase more quickly. Kim said the platform also opens possibilities for sequencing other biomolecules.

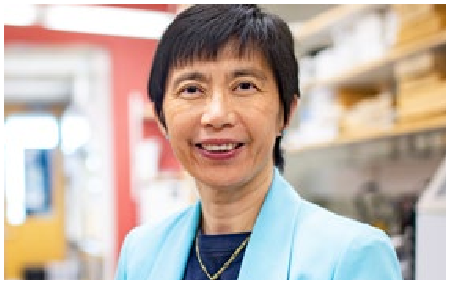
"The ultimate goal is to have a hand-held DNA sequencing device that is fast, accurate and can be used anywhere," Kim said. "This would reduce the cost of DNA sequencing."

In addition to Kim, UT Dallas researchers included co-lead author Dr. Juan Pablo Oviedo PhD'17, a postdoctoral researcher at the University of Notre Dame; Xin Peng, a former exchange student from the University of Science and Technology Beijing; Longsheng Xia MS'13, a senior software engineer at Google; Dr. Qingxiao Wang PhD'20, a materials science and engineering postdoctoral fellow; Kevin Garcia, former summer intern from Monterrey Institute of Technology and Higher Education in Mexico City; and Dr. Jinguo Wang, associate director of the Nanocharacterization Facility. The study also included researchers from Southern Methodist University, who were supported by the National Science Foundation.



In this illustration, a single-stranded DNA molecule moves through a nanopore. The nanopore is about 2 nanometers (nm) in diameter. By comparison, a strand of human hair is 80,000 to 100,000 nm wide. A water shell (blue) surrounds the DNA strand.

HSU RECEIVES DEPARTMENT OF ENERGY SETO GRANT



Dr. Julia Hsu, Texas Instruments Distinguished Chair in Nanoelectronics and professor of materials science and engineering, was awarded funding from the Solar Energy Technologies Office (SETO) of the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy under the Fiscal Year 2020 Perovskite Funding Program. This program supports research and development to advance perovskite photovoltaic devices, manufacturing and performance validation.

A total of 22 projects from university, industry and national laboratories were selected to receive $40 million, contributing to the effort to increase affordable solar deployment. This research is essential to achieving the nation's clean-energy goals, managing the climate crisis and creating high-paying jobs. Hsu's project aims to achieve high-speed, low-cost production of high-performance transparent electrodes on plastic substrates, hence overcoming one of the main obstacles to achieving high-efficiency, or greater than 18% efficient, perovskite solar modules with commercial viability.

Currently, the flexible transparent electrodes, typically indium tin oxide films on polyethylene terephthalate (PET) substrates, a type of plastic used to make items like water bottles, are fabricated by vacuum deposition, which is slow and expensive. To improve current technology, her group proposes to employ innovative materials design that can be solution-printed in large areas and adapt a novel annealing method — photonic curing — compatible with high-speed manufacturing. They will collaborate closely with NovaCentrix, a small U.S. business that manufactures photonic curing tools, and Energy Materials Corp., another company that produces perovskite solar modules through roll-to-roll technology. A successful outcome will be an approach to produce high-performing flexible transparent electrodes at a lower final product price through lower capital cost, the economy of scale and reduced materials waste.

Hsu's group has previously applied photonic curing to fabricate flexible metal oxide thin-film electronics and perovskite solar cells on rigid and flexible substrates. The new project will allow the group to build upon previous work on both metal oxides and halide perovskites and expand to large-area perovskite solar cells beyond laboratory research.

RADIATION DETECTION TECHNOLOGY MAY BE NEW WEAPON AGAINST WMD

University of Texas at Dallas researchers have developed a cheaper and more accurate portable technology to detect neutron radiation, which can indicate the presence of materials used for weapons of mass destruction (WMD). The technology can also be used in radiation therapy.

Manufacturing costs for the new material is 100 to 1,000 times less expensive than current radiation detectors. The technology is based on a thin film that allows for smaller, lighter and more efficient sensors. By making these neutron sensors more affordable, they can be used in new ways, such as in networks in airports or in tunnels leading into a large city to detect smuggled special nuclear material, which is radioactive material that can be used to make WMD, said Dr. Manuel Quevedo, professor and department head of materials science and engineering (MSE) in the Erik Jonsson School of Engineering and Computer Science.

Dr. Manuel Quevedo has worked several years to develop a technology that can detect neutron radiation.

"The goal is to make it nearly impossible to move special nuclear materials without being detected," Quevedo said. "For example, if there's a car loaded with radioactive material, you could detect it and actively track the vehicle motion."

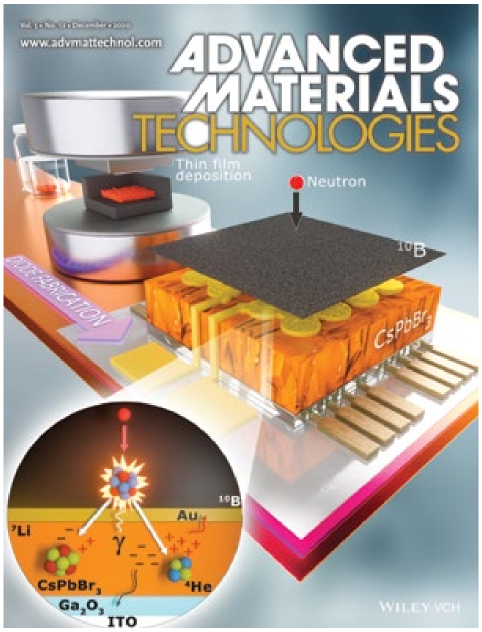
The discovery is the result of several years of research funded by the Air Force Office of Scientific Research, the Department of Homeland Security, the National Science Foundation and Texas Instruments Inc.

Quevedo has been awarded six patents related to the technology, and he and researchers in his Flexible and Large Area Nanoelectronics (FLAN) laboratory published several recent studies on this work, including one published online March 12 in *ACS Applied Electronic Materials* and another Dec. 9, 2020, in the print edition of *Advanced Materials Technologies* that demonstrated that the technology can detect neutron radiation.

Current portable radiation detectors are fragile, bulky and expensive. The UT Dallas researchers' patented technology involves a thin film based on perovskite materials. The film measures as thin as eight micrometers, the size of a strand of spider silk.

Radiation from neutrons is one of the most difficult types of radiation to detect because neutrons have no electrical charge, Quevedo said.

Smaller, lighter and less-expensive neutron radiation detectors have a range of potential applications that



The researchers' work was featured on the back cover of the Dec. 9, 2020, issue of *Advanced Materials Technologies*.

go beyond national security; for instance, in health and consumer protection applications. Quevedo said the devices could detect radioactive waste material from oil and gas drilling, which can come from drilling through rocks that contain natural radioactivity. It also could measure radiation exposure in hospital settings and detect radiation in contaminated scrap metal.

The technology will be tested at five airports in Mexico, Quevedo said. The locations are currently being finalized.

Quevedo's research team includes current and former students and postdoctoral researchers. Co-authors of the *ACS Applied Electronic Materials* and *Advanced Materials Technologies* studies include FLAN lab postdoctoral researchers Dr. Martin Gregorio Reyes-Banda and Dr. Leunam Fernández-Izquierdo; MSE researchers Siddartha Srinivasan Nandagopala Krishnan PhD'20 and Dr. Jesus Alfonso Caraveo-Frescas; and Dr. Xavier Mathew, former visiting research scientist and professor at the Institute of Renewable Energy (IRE) at the National Autonomous University of Mexico (UNAM).

Additional researchers on the *Advanced Materials Technologies* study include Dr. Iker Rodrigo Chávez-Urbiola, former postdoctoral researcher now at the Center for Engineering and Industrial Development in Mexico; Lidia El Bouanani PhD'20, a research scientist and engineer at Qorvo; Joseph Chang PhD'20; Dr. Carlos Avila-Avendano, an MSE research assistant; Nini Rose Mathews, former visiting research scientist and professor at IRE at UNAM; and Maria Isabel Pintor-Monroy PhD'19, now at Interuniversity Microelectronics Centre (IMEC) in Belgium.

CENTER FOR APPLIED AI JOINS THE RICHARDSON INNOVATION QUARTER

The University of Texas at Dallas is partnering with the city of Richardson to support the region's startup and entrepreneur community by establishing a physical presence in the Richardson Innovation Quarter.

UT Dallas will locate five new research centers and an extension of its Venture Development Center in the district, also known as the Richardson IQ® or The IQ®. A 1,200-acre hub for innovation and entrepreneurship, the initiative aims to stimulate collaboration across businesses, attract new jobs and strengthen partnerships between the University, the city and the business community.

The Center for Applied AI at the Richardson Innovation Quarter with UT Dallas Expertise (CAIQUE) will showcase emergent applied AI research at the University to engage companies, win extramural grants, strengthen international partnerships and provide a global network for affiliated students to excel as UT Dallas alumni. Principal investigators include Dr. Walter Voit BS'05, MS'06, associate professor of materials science and engineering and of mechanical engineering; Dr. Latifur Khan, professor of computer science; and Dr. Sriraam Natarajan, professor of computer science.

The multidisciplinary center draws from expertise across the University and has affiliate faculty members from around the world. An industry advisory board will help shape the center's direction.

CAIQUE will be one of five UT Dallas research centers located in the new Richardson Innovation Quarter.

The Richardson Innovation Quarter, depicted in this rendering, will be the new home for five UT Dallas research centers and an extension of the Venture Development Center. Construction will begin this summer, with an opening planned for February 2022.

Erik Jonsson School of Engineering and Computer Science researchers will advance fundamental algorithms, data structures and analytical methods. Additional researchers will pioneer material point methodologies (meshless modeling frameworks) for representing complex topological data to help 3D model the next generation of manufactured parts, including complex medical devices.

Naveen Jindal School of Management researchers will innovate around emergent AI-driven business models and customer engagement strategies, both virtual and physical.

School of Behavioral and Brain Science researchers will pursue evidence-centered design methodologies driven by AI for advancing pedagogy, assessment and fairness.

School of Arts, Technology, and Emerging Communication researchers will use game mechanics to drive social engagement, motivation and thirst for learning and engagement.

School of Natural Sciences and Mathematics researchers will innovate around AI-driven materials synthesis.

CONTACTS FOR ULTRA-THIN ELECTRONIC MATERIALS

Transistors have revolutionized digital circuits by reducing equipment size. Now, researchers at The University of Texas at Dallas are discovering how to create a transistor as thin as the width of an atom.

Dr. Robert Wallace and his research group are focusing on a major area of interest in electronic materials research — transition metal dichalcogenides (TMDs). These materials have properties similar to molybdenum disulfide (MoS_2), a material well known for its use as a solid-state lubricant and oil-purification catalyst.

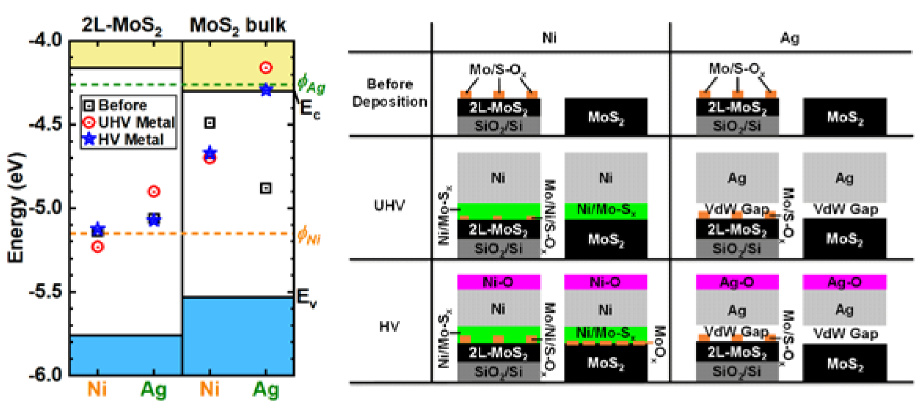
For electronic materials applications, these materials are also intriguing in that they can be rendered as an atomically thin sheet while acting as a digital switch or transistor. This two-dimensional property cannot be easily realized in conventional semiconductor materials such as silicon. However, as with any new material, researchers must overcome many challenges in order to establish the material viability for real-world applications.

Among these challenges are the contacts, currently metals, used on TMDs to form transistor switches. To meet industrial benchmarks, the resistance associated with these metal TMD contacts must be controlled to exceptionally low values for a competitive, low-power digital transistor. By employing the onsite ultra-high vacuum cluster tool, Wallace's research

group has studied these contact interfaces for several years through the support of the Semiconductor Research Corporation Nanoelectronic Computing Research program through the NEW LIMITS center.

Most recently, their work unveiled the interface chemistry and the electronic band alignment between the nickel and silver metal contacts with molybdenum disulfide substrates. They found that nickel reacts extensively with the underlying molybdenum disulfide, while silver does not. Silver results in a desired "ohmic" contact behavior, creating low resistance. Their findings highlight the impact of interface chemistry and the substrate density of defects on the band alignment of metal contacts on TMDs.

This work, "Interface Chemistry and Band Alignment Study of Nickel and Silver Contacts on Molybdenum Disulfide," has been published recently in *ACS Applied Materials & Interfaces*. Contributors include UT Dallas PhD students and research assistants Xinglu Wang and Seong Yeoul Kim.

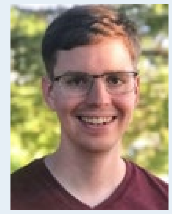


Wallace's research group discovered a substantial difference between the use of nickel and silver as contacts with molybdenum disulfide substrates. Nickel reacted negatively with the substrate, while silver produced a limited reaction.

NEW HIRE

The Department of Materials Science and Engineering extends a warm welcome to Dr. Kyle McCall as its newest assistant professor.

McCall was previously a



postdoctoral researcher under Dr. Maksym V. Kovalenko in the ETH Zurich Inorganic Chemistry laboratory, in Switzerland. During this appointment, he began developing new metal halide materials for light-emission and radiation detection. His research interests focus on the discovery of novel compounds for optoelectronic applications and clarifying the structure-property relationships that enable functional materials.

McCall received his PhD in applied physics from Northwestern University in 2019, where he synthesized bulk single crystals of perovskite-related metal halides for gamma radiation detectors under the joint supervision of Dr. Mercouri Kanatzidis and Dr. Bruce Wessels.

"As a professor of materials science, my goal is to establish an independent research program that encompasses the full range of materials chemistry, from the choice or design of prospective energy-related materials, to their successful incorporation into functioning devices such as solar cells or light-emitting devices. This work will bring the materials-by-design approach to bear on the energy-related problems of our time to enable next-generation sustainable materials."

PHD STUDENT RECEIVES SPIE 2021 OPTICS AND PHOTONICS EDUCATION SCHOLARSHIP

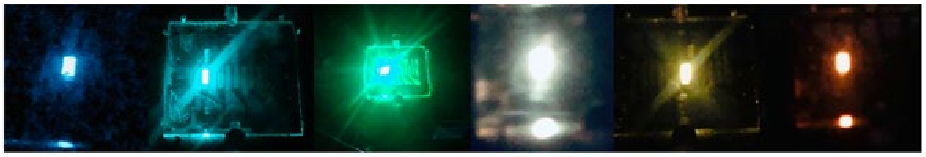
Aditya Mishra has been awarded a 2021 Optics and Photonics Education Scholarship by SPIE, the international society for optics and photonics, for his potential contributions to the field of optics, photonics or a related field. The organization is awarding $298,000 in education scholarships to 78 outstanding SPIE student members. Mishra was the only recipient from Texas.

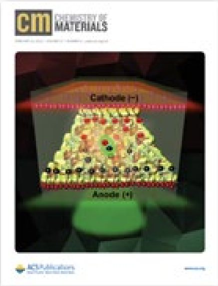
Mishra is currently pursuing a PhD in materials science and engineering at The University of Texas at Dallas under the supervision of Dr. Jason Slinker, associate professor of physics. His research has centered on enhancing the operational stability and efficiency of perovskite-based optoelectronic devices.

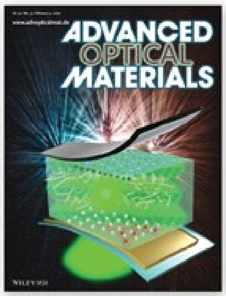
"Optics and photonics are a true fellowship of basic science and engineering and are also the best media to seek new possibilities in nature," Mishra said.

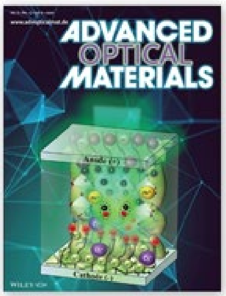
He has published more than 10 research journal articles on perovskite optoelectronics and is currently developing flexible optoelectronic devices. He expresses his gratitude towards his teachers and colleagues for their continuous support. This award will help Mishra pursue his educational and career goals in optics and photonics.

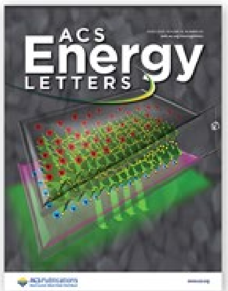
Mishra's work has been published in professional journals including *ACS Energy Letters*, *Advanced Functional Materials*, *Advanced Optical Materials* and *Chemistry of Materials* and has been selected for four journal cover images.







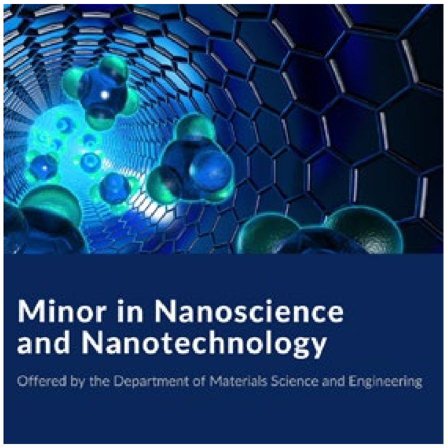




NANO CERTIFICATE AND MINOR

As careers in nanotechnology continue to expand, particularly in the North Texas region, The University of Texas at Dallas plays an important role in educating prospective talent for this growing industry. Although the Department of Materials Science and Engineering does not offer bachelor's degrees in materials science and engineering, undergraduate students have several opportunities to engage in this exciting field of study.

The department offers an undergraduate certificate and an undergraduate minor in nanoscience and nanotechnology. These courses provide a means for students from other disciplines to explore the basic concepts and principles of small matter. Students may continue to join our graduate program or learn about a broad range of careers related to nanoscience and nanotechnology.



CONGRATULATIONS TO OUR NEW PHD ALUMNI GRADUATES!

CLASS OF 2020

SUMMER

Sergiy Rozhdestvenskyy

Title of Dissertation:
Solid-State High Energy Neutron Detector Based on Neutron-Induced Fission of Uranium-238

FALL

Akash Laturia

Title of Dissertation:
Study of the Electrical Properties of Low-Dimensional Materials Using Plane-Wave Computational Methods

Siddartha Nandagopala Krishnan

Title of Dissertation:
Scalable Low-Cost Large-Area Micro-Structured Thermal Neutron Detectors

Udumbara Wijesinghe

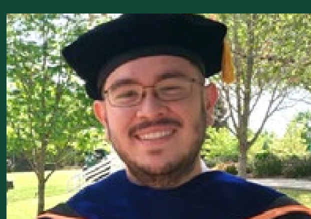
Title of Dissertation:
Integrated Circuit "Astrolabe" Angular Displacement Sensor Using On-Chip Pinhole Optics

CLASS OF 2021

SPRING

Nickolas Ashburn

Title of Dissertation:
Theoretical and Experimental Study of the Catalytic Role of Substrate Surfaces in Deposition Processes



Carlos Avila Avendano

Title of Dissertation:
In-Pixel Sensor Amplification Platforms Based on Polycrystalline Silicon Thin-Film Transistors

Bitan Chakraborty

Title of Dissertation:
Sputtered Electrode Coatings for Neural Stimulation and Recording

Shanmeng Chen

Title of Dissertation:
Study of Quantum Transport in Nanoscale Transistors Using Empirical Pseudopotentials

Sunah Kwon

Title of Dissertation:
Atomic-Scale Characterization of Surface and Interface Dynamics in Novel Materials: cr2ge2te6, nbse2, and Strontium Barium Niobate

Yeonghun Lee

Title of Dissertation:
Quantum Materials Simulations: Excited-State Dynamics and Quantum Transport


NEWDIMENSIONS
THE CAMPAIGN FOR UT DALLAS
Discover. Create. Innovate.
The New Dimensions campaign supports students, artists and innovators as they build a bright tomorrow for all. Explore the future at newdimensions.utdallas.edu, and join the Comet community in raising $750 million for transformational priorities across campus that will fuel impact around the world.
Attract the Best and Brightest Students
Transform the Arts on Campus
Enhance Lives Through Research
Watch the virtual launch:
utdallas.edu/launch
UTD
THE UNIVERSITY OF TEXAS AT DALLAS

UT DALLAS

ERIK JONSSON SCHOOL
OF ENGINEERING AND COMPUTER SCIENCE
Department of Materials Science and Engineering
The University of Texas at Dallas
800 West Campbell Road, RL10
Richardson, TX 75080

mse.utdallas.edu

@UTDMaterialsScience

@UTDMaterialsSci

utdallasjonsson

[FEARLESSengineering®]