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Welcome from the Society Presidents

On behalf of the Microscopy Society of America, the Microanalysis Society, and the Microscopical Society of Canada (Société de Microscopie du Canada) we welcome you to Baltimore, Maryland for Microscopy & Microanalysis 2018. Baltimore and its famous Inner Harbor promise to be an exciting venue with ample opportunity to visit old friends and to meet new colleagues with a common interest in microscope development and applications. The Inner Harbor features many attractions for families, including the National Aquarium and Maryland Science Center, the historic tall ships and U.S. Navy and Coast Guard museum vessels, and great dining opportunities, both on land and sea (harbor dinner cruises). We hope that you enjoy all that Charm City and its region have to offer.

The Program Committee, led by Yoosuf Picard, Alice Dohnalkova, James LeBeau and Nabil Bassim, has developed a comprehensive and exciting group of Symposia led by leaders in their respective fields of microscopy and analysis. As a group, the Symposia capture our members' diverse fields of research, including Advances in Instrumentation and Techniques Development, and Applications in the Biological and Physical Sciences. We encourage you to scan through this Call for Papers for a complete list of Symposia, and contribute to the program by submitting one or more scientific papers to the meeting. Presentations will include a range of platform and posters. New to our meeting this year will be provision of a small table for each poster presentation, which will allow presenters to use a laptop or other digital media format to present animations and movies of their data to enhance their presentations. The leadership of our Societies and the Program Committee feel that with the advancement of three-dimensional reconstruction and other techniques that are best illustrated by these modern dynamic styles, this will provide a unique opportunity for many poster presenters to fully illustrate their data.

The meeting itself will be preceded by our usual array of Sunday Short Courses, three Pre-Meeting Congresses, and our Sunday evening Opening Reception that provides an opportunity to network with colleagues and friends. Following the success of the Inaugural Pre-Meeting Congress in St. Louis led by our Early-career Professionals and Student Council, we will again have a Pre-Meeting Congress featuring the outstanding work done by students and post-doctoral Fellows attending the meeting. If you are an early-career scientist, please consider contributing to this Pre-Meeting Congress. The technical program will kick off with our annual Monday morning plenary session, featuring the major awards ceremonies for the sponsoring societies, the M&M meeting awards, and two exciting plenary talks. One plenary talk will be by Manu Prakash, inventor of the foldscope that has brought imaging to remote regions of the world for imaging of parasites and a range of diseases. The second plenary will be by Jon Larsen, author of "*In Search of Stardust: Amazing Micrometeorites and Their Terrestrial Imposters*" that provides amazing microscopy of micrometeorites found in common locations such as rooftops.

The M&M meeting also showcases the largest annual exhibition in microscopy and features the latest state-of-the-art instrumentation and accessories in microscopy and microanalysis. Educational opportunities throughout the week include tutorials covering select topics in physical and biological sciences, educational outreach sessions for students and teachers, our Technologists' Forum, and our ever-popular vendor tutorials, held Monday through Wednesday after the Exhibit Hall closes.

M&M 2018 is an opportunity to stay abreast of the latest technologies, hear about new developments in the techniques and applications of all areas of microscopy and microanalysis, and most importantly network with colleagues. We're pleased to spend this time together in Baltimore!

Robert Price
President,
Microscopy Society
of America

Masashi Watanabe
President,
Microanalysis Society

Joaquin Ortega
President, Microscopical
Society of Canada / Société
de Microscopie du Canada

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WELCOME FROM THE PROGRAM CHAIRS

Welcome to Microscopy and Microanalysis 2018 in Baltimore, Maryland!

M&M 2018 MICROSCOPY & MICROANALYSIS
August 5-9, 2018 • Baltimore, MD

The Microscopy Society of America (MSA), the Microanalysis Society (MAS), and the Microscopical Society of Canada/Société de Microscopie du Canada (MSC/SMC) welcome you to Microscopy and Microanalysis 2018 (M&M 2018) in Baltimore, Maryland. As you have come to expect, M&M 2018 features the latest innovative applications and instrumentation developments in microscopy and microanalysis across the biological and physical sciences.

The M&M 2018 meeting features nearly 40 technical symposia, and numerous educational opportunities for students, technologists, and scientists in the form of courses, tutorials, Tech Forum and special panels on "Entrepreneurship in the Microscopy Community" and "Procuring Government Funding for Microscopy Instrumentation and Research." Pre-meeting events include Sunday short courses as well as pre-meeting congresses on microanalytical standards and electron microscopy in liquids/gases. MSA Student Council is organizing its second annual pre-meeting congress designed specifically for early career scientists.

We are pleased to feature Professor Manu Prakash, Assistant Professor in Bioengineering at Stanford University, who will speak on the very real possibility of how and why "Every Child in the World Should Carry a Microscope in Their Pocket." Our second plenary speaker is Jon Larsen, author of "In Search of Stardust," the first comprehensive popular science book on micrometeorites. His presentation will show how anyone can find micrometeorites in populated areas using simple tools and a microscope.

The Executive Program Committee and the dozens of symposia organizers have worked tirelessly to produce the technical program for M&M 2018. On behalf of the Executive Program Committee, MSA, MAS, MSC/SMC, and the numerous volunteers that organize this event, welcome to Baltimore and M&M 2018! Hope you have a great week!

Yoosuf Picard
PROGRAM CHAIR

Alice Dohnalkova
PROGRAM VICE-CHAIR

James LeBeau
MAS CO-CHAIR

Nabil Bassim
SMC/MSC CO-CHAIR

Using Microscopy to Find Stardust Anywhere

Jon Larsen[1], Matthew Genge[2] and Jan Braly Kihle[3]
[1.] Project Stardust, Oslo, Norway
[2.] Department of Earth Science and Engineering, Imperial College London, London, UK
[3.] Institute for Energy Technology, Kjeller, Norway

Micrometeorites (MMs) are alien stones that are everywhere around us [1]. MMs (~200-400 μm in size) contain stardust older than our Sun and have travelled farther than anything else on Earth. They include matter derived from asteroids and comets, and they hold a wealth of information on the early formation of our solar system. Various example cosmic "spherules" found on Earth are shown in Figure 1(a).

In 2009 a MM literally landed on my table, catching both my attention and intrigue. I became further fascinated by MMs due to an interesting paradox: MMs are the dominant extra-terrestrial material that falls to Earth, yet they cannot be easily found. Historically, MMs could only be found in areas free of any anthropogenic influence, like remote deserts, glaciers and even the Antarctic. MMs fall to Earth at a rate of ~1 particle per square meter per year. Meteorite hunters have tried to build MM traps, but an ideal trap would need to be the size of a football field and have captured particles over decades.

As it turns out, such ideal traps already exist in populated areas: vinyl-covered flat roofs of decades old buildings with low security walls (Figure 1(b)). In 2010, I began collecting dust samples from roofs, roads and parking lots. Over 6 years, I conducted 1000 field searches in populated areas across 50 countries. Using a Zeiss binocular microscope and a custom-built photo rack, I exhaustively examined and classified thousands of particles by color, size and morphology. Recognizing common shapes for anthropogenic and naturally occurring terrestrial particles, I was able to isolate the best MM prospects. In 2015, working with meteorite researchers, scanning electron microscopy and electron microprobe analysis verified the first MM found in a populated area: a 270 μm barred olivine (similar example in Figure 2(a)). Verification and classification of MMs [2] requires careful consideration of particle morphology, composition (chondritic composition [3] example in Figure 2(a)) and microstructure (like magnetite dendritic formation shown in Figure 2(b)). Eventually, 500 MMs were classified [4]. In 2017, I authored and published the book, "In Search of Stardust: Amazing Micrometeorites and Their Terrestrial Imposters." This book is a collection of hundreds of example particles, including both urban MMs as well as various example anthropogenic and terrestrial particles [1]. My extensive travels and interactions with fellow meteorite enthusiasts propelled me to start Project Stardust [5], where amateur MM hunters can document their field search and the use of optical/electron microscopy to identify and analyse MMs. With a broom, a bag, a magnet and a microscope, you can truly find stardust anywhere!

https://doi.org/10.1017/S1431927618001253 Published online by Cambridge University Press

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[1] J Larsen, “In search of stardust: amazing micrometeorites and their terrestrial imposters”, (Voyageur Press, Minneapolis, MN).
[2] MJ Genge, C Engrand, M Gounelle and S Taylor, Meteoritics & Planetary Science 43 (2008), p. 497.
[3] DE Brownlee, B Bates and L Schram, Meteoritics & Planetary Science 32 (1997), p. 157.
[4] MJ Genge, J Larsen, M Van Ginneken and MD Suttle, Geology 45 (2017), p. 119.
[5] J Larsen, Project Stardust, https://www.facebook.com/micrometeorites/

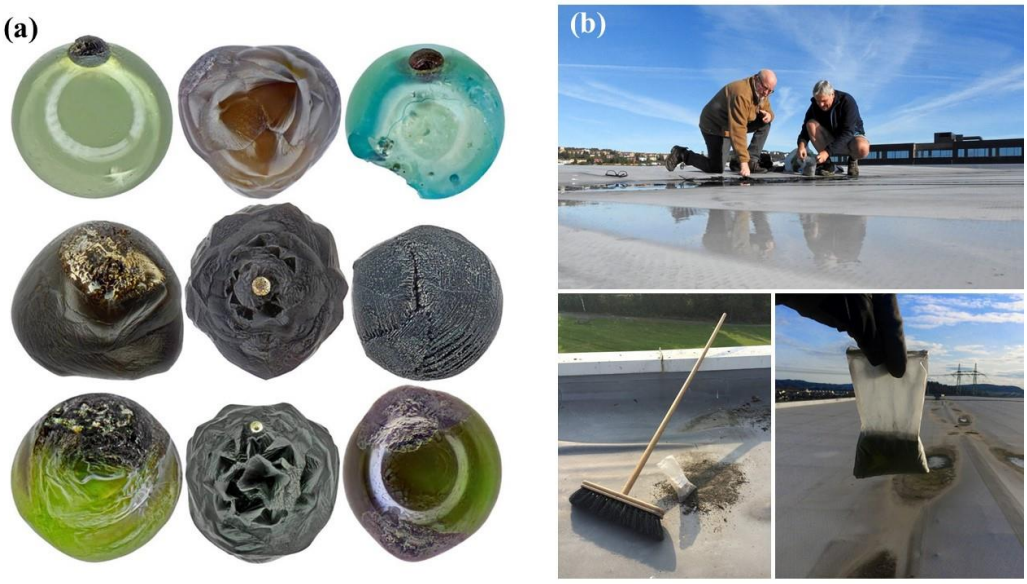

Figure 1. (a) Optical micrographs (OMs) of nine example micrometerorites (MMs): Upper-left - glass / Upper-middle - cryptocrystalline / Upper-right - glass / Middle-left - cryptocrystalline and glass / Middle-middle - cryptocrystalline / Middle-right - barred olivine / Lower-left – porphyritic / Lower-middle - cryptocrystalline / Lower-right- glass. (b) Photographs of Jon Larsen (right) with Morten Bilet conducting a MM search on the roof of BAMA, Oslo, Norway, with additional photographs of the tools.

(a)

	C	O	Mg	Al	Si	Ca	Fe
Example MM weight % from Ref. [1]	8.56	57.86	13.39	0.95	12.22	0.54	6.49
Example MM element/Si Ratio	0.70	4.73	**1.10**	**0.08**	1.00	**0.04**	**0.53**
Antarctic MM element/Si Ratio from Ref. [3]	--	--	**1.06**	**0.091**	1.00	**0.056**	**0.528**

(b)

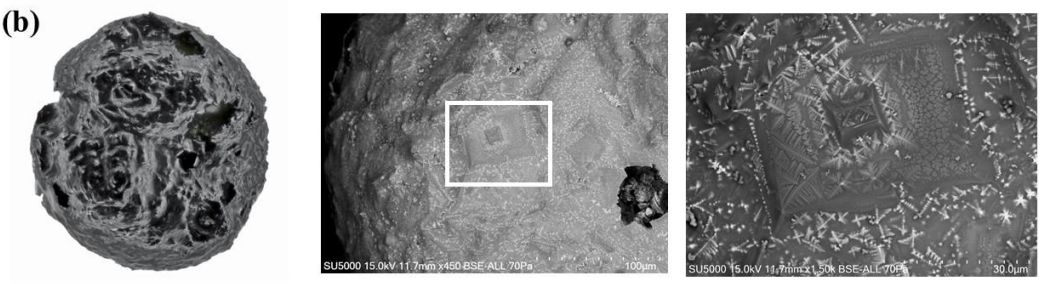

Figure 2. (a) OM of a typical barred olivine MM with a table of EDS-measured elemental composition by weight % [1] that indicates chondritic composition when compared by element/Si ratios to MMs obtained from the Antarctic [3]. (b) OM of a ~700 µm porphyritic olivine MM found at Nesodden, Akershus, Norway, with BSE micrographs indicating dendritic magnetite formation (bright features).

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Every Child in the World Should Carry a Microscope in Their Pocket

Manu Prakash[1]
[1.]Department of Bioengineering, Stanford University, Stanford, CA 94305, USA

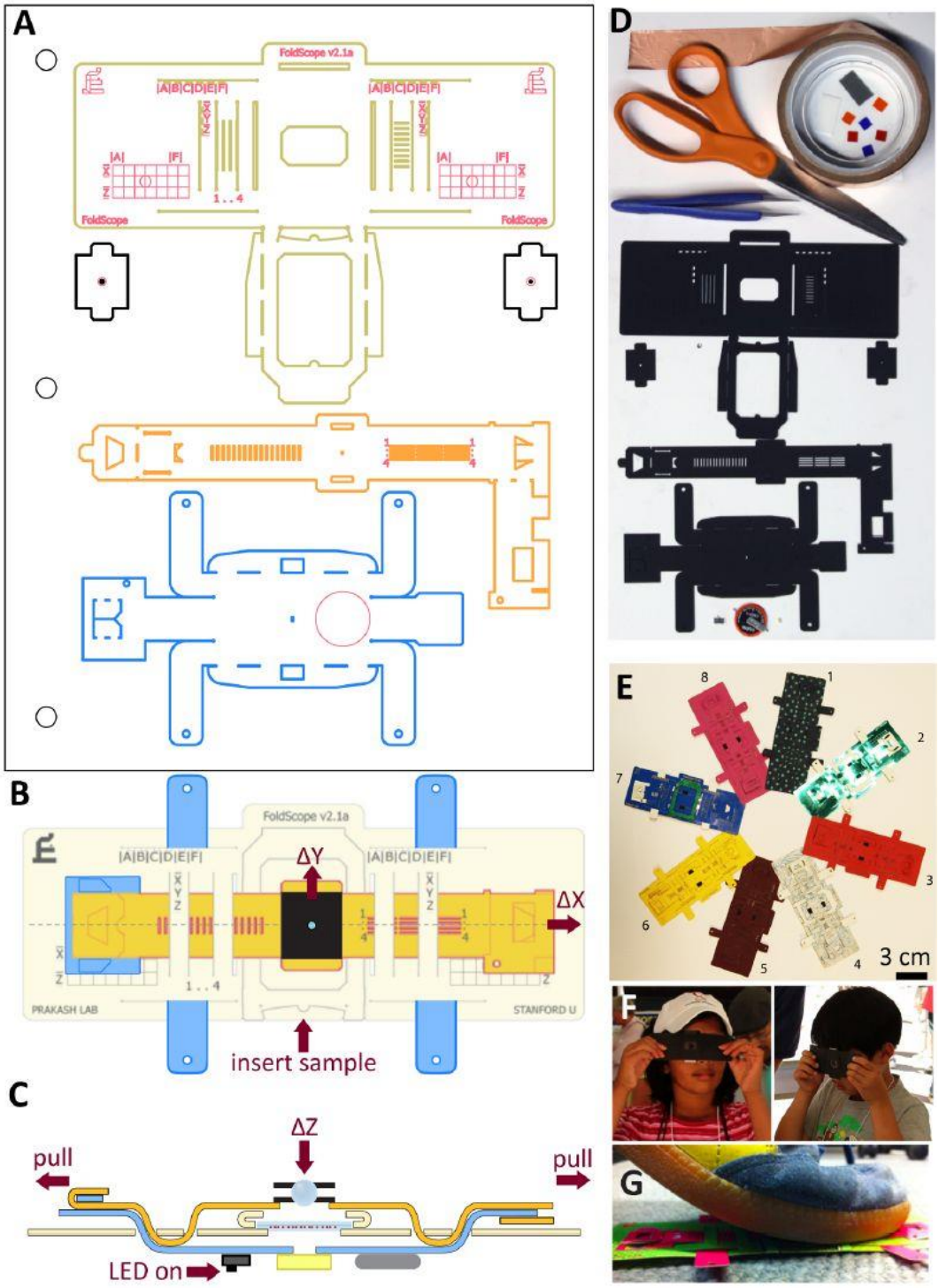
In 2010, I was visiting a health clinic in India and I saw a photo of Mahatma Gandhi looking through a microscope to observe the bacteria that causes leprosy. Gandhi was wearing a dhoti and sitting on the ground, using an expensive European microscope that was impractical for rural India. But Gandhi knew this instrument was needed to help fight disease in his country. This image inspired me to discover new ways to develop low-cost scientific instruments that could be available for everyone, everywhere. Later, while in Thailand, I saw fluorescence microscopes laying on the floor unused because the researchers there were afraid of damaging such expensive equipment.

I decided to build a microscope at a cost of one dollar, yet still have the range of performance necessary to collect useful data. Working on the initial schematics during my flight from Thailand, the first prototype of such an instrument, the Foldscope, became a reality in 2014 [1]. The Foldscope can be assembled in seven minutes from pre-designed, punched cardstock (Figure 1). Folded together using Origami principles, the manually controlled stage has micron-scale positioning control and nanometer scale focusing precision, both by using your thumbs while the instrument is held to your eye. The optical microscope uses a cheap, spherical glass lens and a light emitting diode powered by a watch battery. These microscopes are the size of a bookmark, weigh 8 grams, and can provide magnifications from 140X up to 2,000X.

Jim Cybulski, my former graduate student and Foldscope co-inventor, founded Foldscope Instruments with me in December 2015. The vision for our company is to widely distribute scientific tools like Foldscope while developing online social platforms like “Microcosmos” [2] to allow information sharing and networking for any curious person interested in scientific exploration. Global distribution of Foldscopes across over 135 countries has allowed many activities, including: identification of microscopic eggs for agricultural pests in India, cataloguing the biodiversity of soil arthropods in the Amazon, detection of fake currency and medicine, and mapping pollen diversity in a city landscape. My hope is to extend “frugal science” in a variety of diagnostic tools, including paper-based centrifuges [3] and even realizing a $100 electron microscope.

For children, everything they touch, experience and hold has a microscopic component. Every living thing is made living cells, so just like with astronomy, when you look through a microscope lens, there are galaxies of things crawling around. Growing up in a small town in India, I deeply understand what access to simple but powerful scientific instruments could mean for any kid out there in the world. So, I passionately believe the very real possibility that every child in the world could and should carry a microscope in his/her pocket.

https://doi.org/10.1017/S1431927618013491



References:
[1] JS Cybulski, J Clements, and M Prakash, PloS one 9.6 (2014), p. e98781.
[2] M Prakash, Microcosmos, http://microcosmos.foldscope.com/
[3] MS Bhamla, B Benson, C Chai, G Katsikis, A Johri and MPrakash, Nature Biomedical Engineering. **1** (2017), p. 0009.

Figure 1. Foldscope design, components and usage. (A) CAD layout of Foldscope paper components on an A4 sheet. (B) Schematic of an assembled Foldscope illustrating panning, and (C) cross-sectional view illustrating flexure-based focusing. (D) Foldscope components and tools used in the assembly, including Foldscope paper components, ball lens, button-cell battery, surface-mounted LED, switch, copper tape and polymeric filters. (E) Different modalities assembled from colored paper stock. (F) Novice users demonstrating the technique for using the Foldscope. (G) Demonstration of the field-rugged design, such as stomping under foot. Reproduced from [1].

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1961	D. Maxwell Teague	1986	Robert M. Glaeser	2012	Janet H. Woodward
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2018

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Kazuo Ishizuka
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Guillermo Solórzano-Naranjo
Judy Yang
Jian-Min Zuo

2017

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Paul E. Fischione
Christopher J. Kiely
Jeanette Killius
Laurence D. Marks
Peter Rez
Phillip E. Russell
Heide Schatten

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Ernest L. Hall
David N. Mastronarde
Stuart McKernan
Renu Sharma
George D.W. Smith
Kenneth A. Taylor
James E. Wittig

2015

Rafal E. Dunin-Borkowski
Michael E. Davidson
E. Ann Ellis
Peter W. Hawkes
Miguel José-Yacamán
Kent L. McDonald
Stanley Frank Platek
Michael T. Postek
Susanne Stemmer
Michael M.J. Treacy

2014

Gianluigi Botton
Wah Chiu
Abhaya K. Datye
Marija Gajdardziska-Josifovska
Lucille A. Giannuzzi
Thomas F. Kelly
John F. Mansfield
Martha R. McCartney
Xiaoqing Pan
David W. Piston

2013

Timothy S. Baker
Nigel D. Browning
David J. DeRosier
Hamish L. Fraser
David A. Muller
Michael Radermacher
David J. Smith
Eric A. Stach

2012

Ulrich Dahmen
Margaret Ann Goldstein
Moon Kim
William J. Landis
Jingyue Liu
Beverly E. Maleeff
Robert L. Price
Frances M. Ross
David N. Seidman
Debra Sherman
Nan Yao

2011

Ueli Aebi
Philip E. Batson
Patricia G. Calarco-Isaacson
Peter A. Crozier
J. Alwyn Eades
Brendan J. Griffin
William T. Gunning, III
W. Gray Jerome
Richard D. Leapman
Hannes Lichte
Charles E. Lyman
Michael A. O'Keefe
George Perry
Robert B. Simmons
Janet H. Woodward

2010

Ralph M. Albrecht
Lawrence F. Allard, Jr.
Kenneth H. Downing
Joseph I. Goldstein
Michael S. Isaacson
Michael K. Miller
George Pappas
Stephen J. Pennycook
John P. Petrali
Zhong L. Wang
David B. Williams

2009 *(Inaugural Class)*

Marc Adrian
Ronald M. Anderson
James Bentley
Mary Grace Burke
Ray W. Carpenter
C. Barry Carter
Albert V. Crewe
Marc De Graef
Vinayak P. Dravid
Jacques Dubochet
Patrick Echlin
Raymond F. Egerton
Marilyn G. Farquhar
Don W. Fawcett
Joachim Frank
Robert M. Glaeser
Audrey M. Glauert
Raymond Kenneth Hart
Hatsujiro Hashimoto
Richard Henderson
Peter B. Hirsch
Archibald Howie
Hugh E. Huxley
Takeo Ichinokawa
Sumio Iijima
Shinya Inoué
David C. Joy
Morris J. Karnovsky
Aaron Klug
Ondrej L. Krivanek
Myron C. Ledbetter
Dennis McMullan
Joseph R. Michael
Sara E. Miller
Terrence E. Mitchell
Thomas Mulvey
Dale E. Newbury
Gertrude Rempfer
Jean-Paul Revel
Harald Rose
F.O. Schmitt
Caroline Schooley
Ryuichi Shimizu
John Silcox
Robert Sinclair
S.J. Singer
Fritiof Sjostrand
Kenneth C.A. Smith
Avril V. Somlyo
John C.H. Spence
Alasdair C. Steven
Peter R. Swann
Gareth Thomas
Kiyoteru Tokuyasu
Nigel Unwin
Joseph S. Wall
Oliver C. Wells
Michael J. Whelan
Nestor J. Zaluzec
Elmar Zeitler
Yimei Zhu

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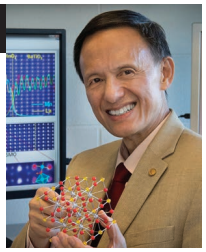
Distinguished Scientist Awards

MSA Microscopy Society of America

PHYSICAL SCIENCES (2018)

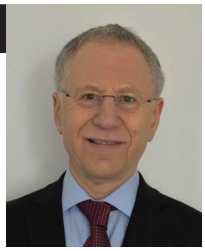


Yimei Zhu

Brookhaven National Laboratory

Prof. Yimei Zhu is Senior Physicist at Brookhaven National Laboratory (BNL) and Adjunct Professor at Columbia University and Stony Brook University. He received his BS from Shanghai Jiaotong University and PhD from Nagoya University. He joined BNL as Assistant Scientist in 1988, rising through the rank to become Tenured Senior Physicist in 2002. He is the founding director of the Institute for Advanced Electron Microscopy at BNL. His research interests include condensed matter physics of correlated electron systems and advanced electron microscopy including ultrafast microscopy instrumentation. He is an Inaugural Fellow and currently the Director for Physical Science of Microscopy Society of America, a Fellow of American Physical Society and a Fellow of American Association for the Advancement of Science. Zhu has published more than 500 peer-reviewed journal articles and delivered more than 300 invited talks at international conferences.

BIOLOGICAL SCIENCES (2018)



Richard D. Leapman

National Institutes of Health

Richard Leapman obtained his B.A. and M.A. degrees in Natural Sciences, and his Ph.D. in physics from the University of Cambridge. He trained as a postdoctoral fellow in the Department of Materials at the University of Oxford, and then under the mentorship of Prof. John Silcox in the Department of Applied and Engineering Physics at Cornell University, where he contributed to the development of electron spectroscopy for the nanoscale characterization of materials. Dr. Leapman subsequently moved to NIH to develop methods based on scanning transmission electron microscopy and electron spectroscopy to determine the structure and chemical composition of cells and supramolecular assemblies. More recently, his group has developed techniques based on STEM tomography for determining 3D ultrastructure in thick sections of cells, as well as serial block face SEM approaches for determining nanoscale tissue architecture. Dr. Leapman received the Burton Medal from the Microscopy Society of America, the Samuel Wesley Stratton Award from the National Institute of Standards and Technology, and the Presidential Science Award from the Microbeam Analysis Society. He was elected a Fellow of the Microscopy Society of America in 2011. He is currently Editor of the Journal of Microscopy (Oxford), a member of the editorial boards of other microscopy and nanotechnology journals, and has served on national scientific advisory committees, including the one for the Advanced Photon Source at Argonne National Laboratory. Dr. Leapman has served as the Scientific Director of the intramural program of the National Institute of Biomedical Imaging and Bioengineering since 2006, and also heads NIBIB's Laboratory of Cellular Imaging and Macromolecular Biophysics.

	BIOLOGICAL SCIENCES	PHYSICAL SCIENCES
1975	Keith R. Porter	Robert Heidenreich
1976	L.L. Marton	Albert V. Crewe
1977	Robley C. Williams	James Hillier
1978	Thomas Anderson	Vernon E. Cosslett
1979	Daniel C. Pease	John M. Cowley
1980	George E. Palade	Gareth Thomas
1981	Sanford L. Palay	Vladimir K. Zworykin
1982	Richard M. Eakin	Benjamin M. Siegel
1983	Hans Ris	Otto Scherzer
1984	Cecil E. Hall	Charles W. Oatley
1985	Gaston Dupouy	Ernst Ruska
1986	F. O. Schmitt	Peter B. Hirsch
1987	Marilyn G. Farquhar	Jan B. LePoole
1988	Morris J. Karnovsky	Hatsujiro Hashimoto
1989	Don W. Fawcett	Elmar Zeitler
1990	Audrey M. Glauert	Gertrude F. Rempfer
1991	Hugh E. Huxley	Archibald Howie
1992	Fritiof Sjöstrand	Oliver C. Wells
1993	Jean-Paul Revel	Kenneth C.A. Smith
1994	Andrew P. Somlyo	Dennis McMullan
1995	Shinya Inoué	David B. Wittry
1996	Myron C. Ledbetter	John Silcox

	BIOLOGICAL SCIENCES	PHYSICAL SCIENCES
1997	S. J. Singer	Peter R. Swann
1998	Avril V. Somlyo	Michael J. Whelan
1999	Sir Aaron Klug	Takeo Ichinokawa
2000	K. Tokuyasu	S. Amelinckx
2001	Patrick Echlin	Thomas Mulvey
2002	Marc Adrian	Ryuichi Shimizu
2003	Joachim Frank	Harald Rose
2004	Robert M. Glaeser	Raymond F. Egerton
2005	Richard Henderson	Sumio Iijima
2006	Joseph S. Wall	John C.H. Spence
2007	Nigel Unwin	Terence E. Mitchell
2008	Alasdair C. Steven	Ondrej L. Krivanek
2009	Jacques Dubochet	Robert Sinclair
2010	George Papas	Michael S. Isaacson
2011	Ueli Aebi	Hannes Lichte
2012	Timothy S. Baker	Ulrich Dahmen
2013	David J. DeRosier	C. Barry Carter
2014	Wah Chiu	David J. Smith
2015	Michael W. Davidson	Peter W. Hawkes
2016	Kenneth H. Downing	George W. Smith
2017	David W. Piston	Nestor J. Zaluzec

Major Society Awards

BURTON MEDAL AWARD (2018)

Lena F. Kourkoutis
Cornell University

Lena F. Kourkoutis is an Assistant Professor of Applied and Engineering Physics and James C. and Rebecca Q. Morgan Sesquicentennial Faculty Fellow at Cornell University. Her electron microscopy group focuses on understanding and controlling nanostructured materials, from complex oxides to materials for energy storage to biomaterials. They use advanced electron microscopes to study these systems atom-by-atom and develop new cryogenic techniques to gain access to low temperature electronic states as well as to study processes at liquid/solid interfaces. Kourkoutis received her undergraduate degree in Physics from the University of Rostock, Germany in 2003, and then moved to Ithaca where she was awarded a Ph.D. in 2009. As a Humboldt Research Fellow, she spent 2011-2012 in the Molecular Structural Biology Group at the Max Planck Institute of Biochemistry in Martinsried, Germany. She returned to Cornell University in 2012 and joined the Cornell Faculty in 2013. Kourkoutis is recipient of the 2013 Albert Crewe Award, a 2014 Packard Fellowship for Science and Engineering, a 2016 Presidential Early Career Award for Scientists and Engineers, and a 2017 NSF CAREER award. She is also a Kavli Fellow of the National Academy of Sciences.

YEAR	RECIPIENT
1975	James Lake
1976	Michael S. Isaacson
1977	Robert Sinclair
1978	David C. Joy
1979	Norton B. Gilula
1980	John C.H. Spence
1981	Barbara J. Panessa-Warren
1982	Nestor J. Zaluzec
1983	Ronald Gronsky
1984	David B. Williams
1985	Richard D. Leapman
1986	J. Murray Gibson
1987	Ron A.Milligan
1988	A.D. Romig, Jr.
1989	Laurence D. Marks
1990	W. Mason Skiff
1991	Joseph R. Michael
1992	Kannan M. Krishnan
1993	Joseph A.N. Zasadzinski
1994	Jan M. Chabala
1995	Joanna L. Batstone
1996	Vinayak P. Dravid
1997	P.M. Ajayan
1998	Ian M. Anderson
1999	Zhong Lin Wang
2000	Eva Nogales
2001	Jian Min Zuo
2002	Nigel D. Browning
2003	Frances M. Ross
2004	Z. Hong Zhou
2005	David J. Larson
2006	David A. Muller
2007	Peter D. Nellist
2008	Steven J. Ludtke
2009	Eric A. Stach
2010	Sergei V. Kalinin
2011	Radostin Danev
2012	David S. Ginger
2013	John L. Rubinstein
2014	Maria Varela
2015	Andrew M. Minor
2016	Miaofang Chi
2017	Christopher J. Russo

MORTON D. MASER DISTINGUISHED SERVICE AWARD (2018)

Donovan N. Leonard
Oak Ridge National Laboratory

Donovan N. Leonard has been a member of MSA since 1998. He is looking forward to his new role as Vice-Chair of the MSA Educational Resources (2018-2020) and is pleased to currently be the organizer of the MSA Physical Sciences Tutorials (2017-2019) and X90: Microscopy in the Classroom symposia (2018, 2010-2011). He has served on the MSA Executive Program Committee (2015, MAS Co-Chair), MSA Fellows Committee (2012-2015) and MSA Education Committee (2011-2014). Additionally, he has been an instructor for MSA In-Meeting workshop titled Nanomaterial Microscopy & Microanalysis (2008-2012) and will be instructor for a MSA Sunday Short Course titled Sample Preparation for High-Resolution EM of Materials (2018). He has been an active member of his local affiliated society, the Appalachian Region Microscopy Society (AReMS), since 1998 and served as President (2012-2014) and webmaster (2008-2014). Donovan is currently a Senior Technical Staff Member in the Materials Science & Technology Division at Oak Ridge National Laboratory. He received his Ph.D. in Materials Science & Engineering from North Carolina State University in 2002 and joined ORNL in 2007. Before ORNL he was tenure track faculty in the Physics & Astronomy Dept. of Appalachian State University and had worked for IBM in microelectronics packaging applications. His research now involves daily application of advanced microscopy and microanalysis methods to energy related materials at length scales from the atomic level to the macro scale. More specifically, aberration corrected scanning transmission electron microscopy (STEM) and electron energy loss spectroscopy (EELS) of quantum materials in addition to EPMA/WDS, EBSD and EDS analysis of materials critical for vehicle lightweighting, fossil, fusion and solar applications.

YEAR	RECIPIENT
1992	Ronald M. Anderson
	G. W. Bailey
	Frances L. Ball
	M. Blair Bowers
	Deborah L. Clayton
	Joseph Harb
	Kenneth R. Lawless
	Morton D. Maser
	Caroline Schooley
	John H.L. Watson
1993	E. Laurence Thurston
1994	Richard F.E. Crang
1995	Raymond K. Hart
1996	José A. Mascorro
1997	William T. Gunning III
1998	Nestor J. Zaluzec
1999	Charles E. Lyman
2000	Barbara A. Reine
	Hildegard H. Crowley
2002	Beverly E. Maleeff
2003	M. Grace Burke
2004	Ralph M. Albrecht
2005	W. Gray (Jay) Jerome
2006	Jeanette Killius
2007	Robert L. Price
2008	Stuart McKernan
2010	Pamela F. Lloyd
2011	Janet H. Woodward
2012	Gina E. Sosinsky
2013	Caroline A. Miller
2014	Michael Marko
2015	JoAn Hudson
2016	Amanda Lawrence
2017	David W. Tomlin

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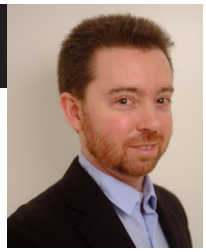
ALBERT CREWE AWARD (2018)



Timothy Pennycook
Max Planck Institute for Solid State Research, Germany

Timothy J. Pennycook is a research scientist at the Max Planck Institute for Solid State Research in Stuttgart, Germany, working to develop new techniques in aberration corrected scanning transmission electron microscopy (STEM). He received his PhD in Physics from Vanderbilt University in 2012, combining density functional theory with STEM to investigate materials, uncovering the origin of colossal ionic conductivity in yttria-stabilized zirconia and, using dynamic STEM imaging, revealing the origin of white light emission from ultrasmall CdSe nanoclusters. As a Research Fellow with the University of Oxford, based at the SuperSTEM laboratory in Daresbury, he developed 3D spectroscopic imaging with optical sectioning, quantification of the atomic scale dynamics involved in solid state phase changes, and a new method of high efficiency ptychography for phase contrast imaging. In 2014 Pennycook joined the Faculty of Physics, University of Vienna, using STEM to study 2D materials, and in 2015 was awarded a Marie-Sklodowska-Curie Individual Fellowship to continue his research into ptychography. He has shown that electron ptychography offers not only the highest efficiency imaging in STEM, but also gives double resolution and much greater robustness to temporal incoherence than high resolution transmission electron microscopy, revealing a new route to low dose imaging of beam sensitive materials. In 2017 he moved to Stuttgart to further develop these techniques.

YEAR	RECIPIENT
2012	Wu Zhou
2013	Lena Fitting-Kourkoutis
2014	Jinwoo Hwang
2015	Meng Gu
2016	Ryo Ishikawa
2017	Pinshane Y. Huang

GEORGE PALADE AWARD (2018)

No 2018 awardee.

YEAR	RECIPIENT
2012	Gabriel C. Lander
2013	Peng Ge
2014	Ricardo C. Guerrero-Ferreira
2015	Alexey Amunts
2016	Dmitry Lyumkis
2017	Rengasayee Veeraraghavan

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Major Society Awards

HILDEGARD H. CROWLEY OUTSTANDING TECHNOLOGIST AWARD FOR BIOLOGICAL SCIENCES (2018)

Anchi Cheng
New York Structural Biology Center

EDUCATION: B.S. Chemistry – National Taiwan University, Taipei, Taiwan, R.O.C. (1988) Ph.D. Chemistry – The Ohio State University (1995).

Anchi Cheng spent most of her undergraduate senior year in an X-ray crystallography lab that studies the bonding property of sulfur with hydrocarbon. She has a strong background I instrument and processing automation gained by the study of lipid phase transition at synchrotron radiation source facilities during her graduate study. As a postdoctoral research associate, she used electron crystallography to determine the structure of aquaporin 1 and connexin 43, where she became an expert user of TEM. In addition, she developed methods for evaluating the data distribution and an error analysis method based on bootstrap resampling. As her interests turned to technology development for cryo-TEM, she has become a key developer of software for automated molecular microscopy (Leginon) and building an integrated pipeline for data processing (Appion) in single-particle averaging, tomography, and two-dimensional crystal screening. Each of these developments was driven by different biological projects that she executed or oversaw. As a user-turned developer, she understands the importance of providing both robust automation as well as flexibility of user redirection.

YEAR	RECIPIENT
1993	Ben O. Spurlock
1994	*not awarded*
1995	Kai Chien
1996	*not awarded*
1997	John P. Benedict
1998	Hilton H. Mollenhauer
1999	John M. Basgen
2000	Nancy Crise Smith
2001	*not awarded*
2002	José A. Mascorro
2003	*not awarded*
2004	*not awarded*
2005	John J. Bozzola
2008	Thomas Deerinck
2009	Mary Morphew
2010	E. Ann Ellis
2011	Robert Grassucci
2012	Kunio Nagashima
2013	Robyn Roth
2014	Hong Yi
2015	Norman Olson
2016	Frank Macaluso
2017	Patricia S. Connelly

CHUCK FIORI OUTSTANDING TECHNOLOGIST AWARD FOR PHYSICAL SCIENCES (2018)

Chengyu Song
Lawrence Berkeley National Laboratory

Chengyu Song obtained his B.S. in Materials Science from Zhejiang University, China in 1989, and M.S. from Shanghai Institute of Ceramics, Chinese Academy of Sciences, where he first received trainings in electron microscopy. After finishing two-year visiting scholarship in Argonne National Laboratory, he joined National Center for Electron Microscopy (NCEM) at Lawrence Berkeley National Laboratory as a Research Associate in 1997, and had been a Senior Scientific Engineering Associate since 2005. NCEM is one of the world's foremost centers for electron microscopy. Having merged with the Molecular Foundry in 2014, it continues to provide user community with cutting-edge instrumentation and expertise. Chengyu has been a key operator of NCEM's state-of-art electron microscopes, such as 1 MeV Atomic Resolution Microscope, One Angstrom Microscope, and Transmission Electron Aberration-corrected Microscopes (TEAMs). Over the past two decades, he collaborated with hundreds of scientists and visitors from many part of the world, and trained over a thousand graduate students and post doctors from universities nationwide.

YEAR	RECIPIENT
1993	*not awarded*
1994	Bernard J. Kestel
1995	*not awarded*
1996	David W. Ackland
1997	Stanley J. Klepeis
1998	Charles J. Echer
1999	John C. Wheatley
2000	*not awarded*
2001	Conrad G. Bremer
2002	*not awarded*
2003	Edward A. Ryan
2004	Mark C. Reuter
2005	Chris Nelson
2008	*not awarded*
2009	Lynne Gignac
2010	*not awarded*
2011	*not awarded*
2012	*not awarded*
2013	K. Shawn Reeves
2014	Eddy Garcia-Meitin
2015	Masahiro Kawasaki
2016	*not awarded*
2017	Richard L. Martens

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Strategic Planning	Keana Scott
Sustaining Membership	Lucille Giannuzzi
Topical Conferences	Paul K. Carpenter

PAST PRESIDENTS

1968	L.S. Birks
1969	K.F.J. Heinrich
1970	R.E. Ogilvie
1971	A.A. Chodos
1972	K. Keil
1973	D.R. Beaman
1974	P. Lublin
1975	J.E. Colby
1976	E. Lifshin
1977	J.I. Goldstein
1978	J.D. Brown
1979	D.F. Kyser
1980	O.C. Wells
1981	J.R. Coleman
1982	R.L. Myklebust
1983	R. Bolon
1984	D.C. Joy
1985	D.E. Newbury
1986	C.G. Cleaver
1987	C.E. Fiori
1988	W.F. Chambers
1989	D.B. Wittry
1990	A.D. Romig, Jr
1991	J.T. Armstrong
1992	D.B. Williams
1993	T.G. Huber
1994	J.A. Small
1995	J.J. McCarthy
1996	D.E. Johnson
1997	J.R. Michael
1998	R.B. Marinenko
1999	J.J. Friel
2000	C.E. Lyman
2001	R.W. Linton
2002	G.P. Meeker
2003	E.S. Etz
2004	P.K. Carpenter
2005	I.H. Musselman
2006	R. Gauvin
2007	P.G. Kotula
2008	I.M. Anderson
2009	C. Johnson
2010	E.P. Vicenzi
2011	J.H.J. Scott
2012	J.F. Mansfield
2013-14	K.L. Bunker
2015-16	T.F. Kelly

Major Society Awards

DUNCUMB AWARD FOR EXCELLENCE IN MICROANALYSIS (2018)

Richard D. Leapman
National Institutes of Health

Richard Leapman received his education at Peterhouse, Cambridge University, UK, where he obtained a B.A. in Natural Sciences, followed by a Ph.D. in physics from the Cavendish Laboratory under the supervision of Prof. Vernon Ellis Cosslett. He then trained as a postdoctoral fellow in the Department of Materials at the University of Oxford, and also under the mentorship of Prof. John Silcox in the Department of Applied and Engineering Physics at Cornell University, where he contributed to the development of electron energy loss spectroscopy (EELS) for the nanoscale characterization of materials. Dr. Leapman subsequently moved to the National Institutes of Health to develop methods that combined scanning transmission electron microscopy (STEM) and EELS for analyzing the organization and composition of cells and supramolecular assemblies. More recently, his group has developed techniques based on STEM tomography for imaging the 3D ultrastructure of cells, as well as serial block face SEM approaches for determining nanoscale tissue architecture. Dr. Leapman received the Presidential Science Award from the Microbeam Analysis Society and was elected a Fellow of the Microscopy Society of America in 2011. He is currently an Editor of the Journal of Microscopy, a member of the editorial boards of other microscopy and nanotechnology journals, and has participated on national scientific advisory committees, including the one for the Advanced Photon Source at Argonne National Laboratory. Since 2006, Dr. Leapman has served as the Scientific Director of the intramural program of the National Institute of Biomedical Imaging and Bioengineering, NIH, where he also heads the Laboratory of Cellular Imaging and Macromolecular Biophysics.

PREVIOUS AWARDEES

2007	D.B. Williams
2008	J. I. Goldstein
2009	D.E. Newbury
2010	D.C. Joy
2011	J.R. Michael
2012	J. Bentley
2013	E. Lifshin
2014	O. L. Krivanek
2015	P. J. Statham
2016	David Muller
2017	Thomas F. Kelly

KURT F.J. HEINRICH AWARD (2018)

Yoosuf N. Picard
Carnegie Mellon University

Professor Picard obtained a B.S. in Mechanical Engineering from Louisiana Tech University in 2001 and a Ph.D. in Materials Science and Engineering from the University of Michigan-Ann Arbor in 2006. During his graduate career, he was a Microsystems Engineering and Science Applications Fellow at Sandia National Laboratories where he researched focused ion beam applications as well as pulsed laser ignition phenomenon in energetic thin films. Following his doctoral research on materials modifications by femtosecond lasers, he was a National Research Council postdoctoral research associate at the U.S. Naval Research Lab (NRL), where he conducted electron microscopy studies of GaN devices, SiC thin films, and metal-oxide nanowires. He joined the faculty at Carnegie Mellon University (CMU) in 2009 as an assistant research professor in the Materials Science and Engineering Department and was later promoted to associate research professor in 2014. His research group develops and applies advanced electron microscopy methods for quantitative microstructural characterization and *in situ* analysis of defect behavior in nanoscale devices, ceramic surfaces and new metal alloys. Yoosuf continues to progress electron channeling contrast imaging (ECCI) for non-destructive defect identification, with interests in developing defect engineering strategies for bulk crystalline surfaces. He is an active member of the Minerals, Metals and Materials Society (TMS), Microscopy Society of America (MSA) and Microanalysis Society (MAS). He served as MAS Director (2015-2018) as well as a co-organizer for the MAS Topical Conferences on EBSD 2012, 2014 and 2016. He has also served as leader of the MSA "Electron Crystallography and Automated Mapping Techniques" focused interest group. He is the Program Chair for Microscopy and Microanalysis 2018. Yoosuf is editor for the journal *Microscopy and Microanalysis*. At Carnegie Mellon University, he advises the MSE Graduate Student Advisory Council and serves on the steering committee for the Energy Science Technology & Policy Master's degree program. Yoosuf teaches courses on materials characterization and electron microscopy for both undergraduate and graduate students. He has co-authored over 70 peer-reviewed publications and was a recipient of the Birks Award for best contributed paper at Microscopy and Microanalysis 2009.

PREVIOUS AWARDEES

1986	P.J. Statham
1987	J.T. Armstrong
1988	D.B. Williams
1989	R.D. Leapman
1990	R.W. Linton
1991	A.D. Romig, Jr.
1992	S.J. Pennycook
1993	P.E. Russell
1994	J.R. Michael
1995	E.N. Lewis
1997	R. Gauvin
1998	V.P. Dravid
1999	J. Bruley
2000	H. Ade
2001	C. Jacobsen
2002	D.A. Wollman
2005	M. Watanabe
2006	M. Toth
2007	G. Kothleitner
2008	P.G. Kotula
2009	D. Drouin
2010	H. Demers
2011	L.N. Brewer
2012	E.A. Marquis
2013	J.M. LeBeau
2014	B.P. Gorman
2015	P. Pinard
2016	Julien Allaz
2017	Andrew Herzing

PRESIDENTIAL SCIENCE AWARD (2018)

M. Grace Burke
University of Manchester,
United Kingdom

Prof. M. Grace Burke is the Director of the Materials Performance Centre at the University of Manchester, where she leads investigations of materials' behavior in nuclear power systems, with particular emphasis on the role of microstructure. In addition to her MPC role, she was also Director of the Electron Microscopy Centre at the University of Manchester from 2012 through 2016. Prior to joining the University in late 2011, she acquired extensive experience in materials for power generation during a her career in the US nuclear industry with research positions at the Westinghouse Science and Technology Center, and the Bettis Atomic Power Laboratory in Pittsburgh, where she was the Consultant Scientist in Materials Technology. Including prior research experience at the US Steel Research Laboratory, she has over 35 years of expertise in steels, materials of construction for nuclear power plants, irradiation damage, SCC, and hydrogen embrittlement of structural alloys. She is particularly known for her application of advanced microscopy/ microanalysis techniques to nuclear materials research, and to the microstructural characterisation of complex materials. Her research into irradiation damage using AP-FIM provided the first evidence of the complex solute-enriched clusters responsible for the irradiation-induced hardening/degradation of welds in PWRs. Her current research continues to involve the application of advanced analytical TEM and in situ ATEM in liquids and gases to study the nanoscale phenomena leading to environment-sensitive degradation of structural alloys. Grace is a recognized expert in numerous international nuclear science and technology organisations including NUGENIA, ICG-EAC, and IGRDM. Grace is a Fellow of ASM International, the Institute of Materials, Minerals and Mining (UK), the Microscopy Society of America, and the Royal Microscopical Society.

PREVIOUS AWARDEES

1977	R. Castaing
1978	K.F.J. Heinrich
1979	P. Duncumb
1980	D.B. Wittry
1981	S.J.B. Reed
1982	R. Shimizu
1983	J. Philibert
1984	L.S. Birks
1985	E. Lifshin
1986	R.L. Myklebust
1987	O.C. Wells
1988	J.D. Brown
1989	J. Hillier
1990	T.E. Everhart
1997	D.B. Williams
1998	F.H. Schamber
1999	R.A. Sareen
2000	R.F. Egerton
2001	P.E. Batson
2002	K. Keil
2003	P.E. Russell
2004	J.T. Armstrong
2005	G. Slodzian
2006	B.J. Griffin
2007	R.D. Leapman
2008	T. F. Kelly
2009	J.R. Michael
2010	J.J. Donovan
2011	P.J. Statham
2012	N.J. Zaluzec
2013	P. Echlin
2014	H.L. Fraser
2015	M.R. Keenan
2016	M. Jercinovic
2017	Michael K. Miller

PRESIDENTIAL SERVICE AWARD (2018)

Vernon Robertson, JEOL

Vernon Robertson has been with JEOL USA for over 32 years and was appointed EPMA/ Surface Analysis Product Manager in early 2016 and will continue as SEM Technical Sales Manager, providing in-house and in the field, technical product support and customer applications support. Vern served as the senior SEM Applications Specialist at JEOL beginning in 1986. He was appointed National Laboratory Manager in 2004, and FEG SEM Product Manager in 2005. Vern received his B.Sc. in Geology with honors from the University of New Hampshire. His prior industrial experience included eight years of consulting in an independent testing lab specializing in industrial and environmental problem solving, with responsibilities including polarized light optical microscopy, and atomic emission and absorption spectroscopy SEM with EDS/ WDS and x-Ray diffraction. Vern was a recent member of the MAS (Microanalysis Society) Council serving as the Corporate Liaison.

PREVIOUS AWARDEES

1977	P. Lublin
1978	D.R. Beaman
1979	M.A. Giles
1980	A.A. Chodos
1981	R.L. Myklebust
1982	J. Doyle
1983	D.E. Newbury
1984	J.I. Goldstein
1985	M.C. Finn
1986	V. Shull
1987	D.C. Joy
1988	C.G. Cleaver
1989	W.F. Chambers
1990	C.E. Fiori
1991	T.G. Huber
1992	E.S. Etz
1993	H.A. Freeman
1994	J.L. Worrall
1995	R.W. Linton
1996	P. F. Hlava
1997	J.A. Small
1998	J.J. McCarthy
1999	T.G. Huber
2000	R.B. Marinenko
2001	C.E. Lyman
2002	J.F. Mansfield
2003	I.H. Musselman
2004	J.R. Michael
2005	G.P. Meeker
2006	H.A. Freeman
2007	P.K. Carpenter
2008	L.M. Ross
2009	V. Woodward
2010	S.A. Wight
2011	D.T. Kremser
2012	C. Johnson
2013	J.J. McGee
2014	I.M. Anderson
2015	S. McKernan
2016	H. Lowers
2017	Daniel Kremser

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MAS Outstanding Paper Awards for 2017

MAS OUTSTANDING PAPER AWARDS (2017)

These awards are presented annually to the authors of outstanding papers from the previous annual meeting in each of four categories.

RAYMOND CASTAING – BEST STUDENT PAPER AWARD:

Characterizing the Effectiveness of Atomic Layer Deposited Coatings for the Prevention of Glass Disease

Miriam Hiebert, University of Maryland

V.G. MACRES – BEST INSTRUMENTATION/SOFTWARE PAPER AWARD:

Using Scanning Transmission X-ray Microscopy to Reveal the Origin of Lithium Compositional Spatiodynamics in Battery Materials

Daan Hein Alsem, Hummingbird Scientific, Inc.

L.S. BIRKS – BEST CONTRIBUTED PAPER AWARD:

Numerical Modeling of Specimen Geometry for Quantitative Multiple Detector EDS

Weizong Xu, North Carolina State University

V.E. COSSLETT – BEST INVITED PAPER AWARD:

Recent Advances of the Open Source MULTEM Program to Provide Accurate and Fast Electron Microscopy Simulations

Ivan Pedro Lobato Hoyos, EMAT, University of Antwerp, Belgium

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Randy Mikula (2013)
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AWARDS

Canadian Foundation for the Development of Microscopy – Bursary Winners:

1. **Sara Makaremi,** McMaster University, adviser prof. Jose Moran-Mirabal
2. **Quentin Stoyel,** McGill University, adviser prof. Raynald Gauvin
3. **Christopher Schankula,** McMaster University, adviser prof. Nabil Bassim
4. **Hesham El-Sherif,** McMaster University, adviser prof. Nabil Bassim

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Blanka Janicek, University of Illinois

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Vivek Garg, Indian Institute of Technology-Bombay, India

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Jungjae Park, Korea Advanced Institute of Science and Technology, South Korea

Stavros Deligiannis, National Technical University of Athens, Greece

Christopher Hobbs, Trinity College Dublin, Ireland

Franziska Seifert, Leibniz Institute for Solid State and Materials Research Dresden, Germany

Josh Vincent, Arizona State University

Peng Dong, McMaster University, Canada

Murat Nulati Yesibolati, Technical University of Denmark

Anna Weiss, Carnegie Mellon University

Daniel Du, University of Minnesota

James Hart, Drexel University

Spencer Reisbick, University of Minnesota

Noah Schnitzer, University of Michigan

Sanaa Ben Djemaa, University of Tours, France

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Mandy Nevins, Rochester Institute of Technology

Yu Yuan, McGill University, Canada

Lucile Brunel-Duverger, Centre de Recherche et de Restauration des Musées, France

Quentin Stoyel, McGill University, Canada

Patrick Trampert, German Research Center for Artificial Intelligence, Germany

Laura Seifert, University of Arizona

Frédéric Voisard, McGill University, Canada

David Baek, Cornell University

Rachel White, The University of Alabama

M&M POSTDOCTORAL SCHOLAR AWARDS

Darius Pohl, Technische Universität Dresden, Germany

Yi Jiang, Cornell University

Wei Zhang, Brookhaven National Laboratory

Zhen Chen, Cornell University

Alejandra Londono-Calderon, Ames Laboratory

Jordan Hachtel, Oak Ridge National Laboratory

Emre Firlar, University of Illinois-Chicago

Paul Smeets, Northwestern University

Stephen House, University of Pittsburgh

Maureen Lagos, McMaster University, Canada

Jiashi Miao, The Ohio State University

M&M PROFESSIONAL TECHNICAL STAFF AWARDS

Zhiyuan Lu, Janelia Research Campus

Lisa Lowery, Sandia National Laboratories

Eric Formo, University of Georgia

Connon Thomas, Max Planck Florida Institute for Neuroscience