

DR EMILIE RINGE

Department of Materials Science and NanoEngineering, Department of Chemistry
& Applied Physics Program

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EDUCATION

Ph.D.	Northwestern University, Evanston, IL, USA Chemistry & Materials Science Research advisors: Profs. Richard P. Van Duyne and Laurence D. Marks Thesis Title: <i>Building the Nanoplasmonics Toolbox through Shape Modelling and Single Particle Optical Studies</i>	2012
Certificate	Northwestern University, Evanston, IL, USA Kellogg Certificate in Management for Scientists and Engineers	2011
B.A. / M.S.	Northwestern University, Evanston, IL, USA Inorganic Chemistry (transfer from McGill) Summa Cum Laude Research advisor: Prof. James A. Ibers Thesis Title: <i>Structure Determination and Characterization of UCuOP, UCu_{0.6}Sb₂ and UFeSe₃, Three Uranium Compounds Containing a First Row Transition Metal</i>	2008
	McGill University, Montreal, Qc, Canada Two out of three years towards Bachelor of Science in Chemistry	2006

RESEARCH

Assistant Professor , Department of Materials Science and Nanoengineering, Department of Chemistry, Applied Physics Program, Rice University, USA	2014-
Research Fellow , Materials Science and Metallurgy Department & Trinity Hall, University of Cambridge, UK	2012-2013
Graduate Student , Northwestern University, Evanston, IL, USA	2008-2012
Visiting Researcher , University of Melbourne, Melbourne, VIC, Australia (3 months)	2011
Undergraduate Researcher , Northwestern University, Evanston, IL, USA	2006-2008
Intern Pharmaceutical Formulation Researcher , Merck Frosst Canada, Kirkland, Qc, Canada (16 months, full time)	2005-2006

RESEARCH AND TEACHING GRANTS

3M Non-Tenured Faculty Award , Renewable yearly for up to 3 years or until tenure, 2017-2020, \$45,000	
Air Force Office of Scientific Research Young Investigator Award (AFOSR-YIP) , 3 years, 2017-2020, \$360,000	
Rice University Creative Venture Fund , 1 year, 2017-2018, \$75,000 (Shared with Co-PI Qimiao Si, Physics and Astronomy Department and Junichiro Kono, Department of Electrical and Computer Engineering)	
American Chemical Society Petroleum Research Fund, Doctoral New Investigator Grant , 2 years, 2016-2018, \$110,000	
National Science Foundation (NSF) Industry/University Collaborative Research Centre , 2 years, 2016-2018, \$60,000 (With Co-PI Isabell Thomann, Electrical and Computer Engineering Department)	
Materials Research Society Outreach Grant , 1 year 2015-2016, \$6,700	
Rice University Centre for Engaged Research and Collaborative Learning Course Development Grant , 6 months, 2014, \$2,000	

FELLOWSHIPS AND SCHOLARSHIPS

Gott Junior Research Fellowship , Trinity Hall, University of Cambridge	2012
Newton International Research Fellowship , Royal Society	2012
Presidential Fellowship , Northwestern University	2011
International Research Fellowship , University of Melbourne	2011
MRSEC Special Merit Fellowship , Northwestern University	2010
Lewis H. Sarrett Scholarship , Northwestern University	2007
Undergraduate Research Grant , Northwestern University	2007
Herbert Brennen Scholarship , McGill University	2005

DISTINCTIONS AND AWARDS

Favourite Professor Award , Scholar-Athlete Banquet (selected by Matthew Calem)	2017
Award for Excellence in Graduate Research , Northwestern University	2012
Anna Louise Hoffman Excellence Award , Iota Sigma Pi Society for Women in Chemistry	2012
Featured in the Office for Research Excellence in Research Report , Northwestern University	2012
Best Poster Award , 5 th International Conference on Surface Plasmon Photonics	2011
Best Poster Award , Noble Metal Particles Gordon Research Conference	2010
Phi Beta Kappa , Northwestern University	2008
B. A. Summa Cum Laude, with Departmental Honors , Northwestern University	2008
Dean's Honor List , Northwestern University	2008
Marple-Schweitzer Memorial Award , Northwestern University	2008
Award for Outstanding Suggestion on Procedure Improvement , Merck Frosst	2005

TEACHING AND COURSE DEVELOPMENT

Rice University

Lecturer, MSNE 582 Electron Microscopy Centre Lab, 15 students	2016-
Lecturer, CHEM 580/MSNE 580 Microscopy Methods, 40 students	2016-
Lecturer, MSNE 201 Introduction to NanoEngineering, 45 students	2014-
Lecturer, CHEM 535/MSNE 435/MSNE 535 Crystallography and Diffraction, 25 students	2014
Lecturer, MSNE 537 Materials Science Senior Lab (Crystallography), 20 students	2014

University of Cambridge

Lecturer, Nanoparticle Shape and Growth, Micro and Nano MPhil NE.05, 20 students	2013
Laboratory Class Lecturer, Electron Microscopy Module for Part II Materials students, Department of Materials Science and Metallurgy, 6 students	2013
Supervisor, Engineering IA, Materials, Trinity Hall, 8 students	2013
Supervisor, Chemistry IB, Molecular Energy Levels and Thermodynamics, Electronic Structure and Properties of Solids, Trinity Hall, 5 students	2013

Northwestern University

Laboratory Teaching Assistant (4 terms), General Chemistry, Raman Spectroscopy, X-Ray Crystallography, 10-15 students	2008-2009
Private Tutor, General Chemistry intensive summer classes, 2 students	2007-2008

Other Institutions

Lecturer, Introduction to NanoEngineering, University of Electronic Science and Technology of China, Chengdu, China, 5-day summer school, 50 students	2015-2016
Lecturer, The Material World & Nanotechnology and NanoEngineering, Canadian International School of Hong Kong, Hong Kong, China, 5-day summer school, 10-20 students per course	2013-2014
Teaching Assistant, General Chemistry, CEGEP Andre-Laurendeau, Qc	2002-2003

RESEARCH GROUP AND MENTORING

Post-docs Supervised	2014-
Anthony Stender (MSNE), Welch-Atwell Fellow for 2 years now Faculty at Ohio University Sadegh Yazdi (MSNE), joint with the Electron Microscopy Centre	
Ph.D. Students Supervised	2014-
Elisabeth Bianco (Chem, joint with Ajayan), Anjali Kumar (Chem), Lauren McCarthy (Chem), Sarah Rehn (Chem), Dayne Swearer (Chem, joint with Naomi Halas), Eduardo Villareal (MSNE)	
Undergraduate Group Members	2014-
Matthew Chagnot (MSNE), Frank Chen (CompSci), Camden Dore (non-Rice), Sofia Gereta (MSNE), Ryan Newell (MSNE), Lauren Poole (MSNE), Karla Rosa (non-Rice)	
Other Undergraduate Mentoring	
Undergraduate and summer students (total 8 students), Northwestern University	2009-2012

LEADERSHIP, SERVICE & OUTREACH AT RICE (KEY EFFORTS BOLDED)

Blue Sky and Capital Campaign Planning Committee Member, GRBSOE	2017
Orientation Week Faculty address speaker	2016
Faculty search committee, CHEM	2016
Keynote speaker for the Smalley-Curl Institute spring graduate student symposium	2015
Gulf Coast Undergraduate Research Symposium: Attendee and judge (2014), MSNE Organizer and Keynote speaker (2015)	2014-2015
Faculty Mentor, Graduate Student Association, MSNE	2014-
Shared Equipment Authority Board Member	2014-
Graduate recruiting committee, CHEM	2015-
Curriculum Committee & Chair of Undergraduate Studies, MSNE	2015-
Director of the Electron Microscopy Centre	2015-
Recruiting events (ice cream social, o-week, discover research), MSNE	2014-
Wiess College Resident Associate	2014-2021
OWLS Days Engineering Panel, Engineering recruiting	2015-

LEADERSHIP, SERVICE & OUTREACH BEYOND RICE (KEY EFFORTS BOLDED)

Symposium Organizer, SciX 2017	2017
Symposium Organizer, PittCon 2017	2017
Director, "The Materials Touch" outreach program	2016-
Conference Host, Texas Society for Microscopy, Rice University	2016
FEI symposium technical committee, Imaging at core to pore scales, Houston	2015
Proposal Review Board Member, Research Associateship Program, National Academies	2015-
Proposal Review Board Chair, National Centre for Electron Microscopy, Lawrence Berkeley National Laboratory (LBNL)	2016-
Proposal Review Board Member, National Centre for Electron Microscopy, LBNL	2014-2016
Symposium Chair, International Union of Crystallography Meeting	2014

LEADERSHIP, SERVICE & OUTREACH BEFORE RICE (KEY EFFORTS BOLDED)

Seminar Chair, Gordon Research Seminar on Noble Metal Particles Conference	2012
Science Books Reader and Recorder, Guide Runner, Blind Services Association	2009-2012
Student Leader, Materials Research Centre, Northwestern University	2011-2012
Outreach Chair, Presidential Fellows Society, Northwestern University	2011-2012
Volunteer Speaker, Science Speaker Corps, Northwestern University	2009-2012
Assistant and Props Master, ETOPiA, science-themed plays, Northwestern University	2009-2011
Outreach Leader, Chute Middle School	2009
Tour Guide, High School and College visits, Merck Frosst	2005-2006

SELECTED PRESS AND MEDIA COVERAGE

Wall Street Journal, “Tiny portraits of the natural world” (2016)

Houston Chronicle, “With \$10 million in her pocket, Rice scientist buys microscope” (2015)

Rice Magazine, “Rice University boots up powerful microscopes” (2015)

Northwestern Excellence in Research Report, “Nanoparticle shape effects and modelling” (2012)

Science Editor’s Choice, “The shape of things to come”, for Wulff Construction for Alloy Nanoparticles (2011)

PROFESSIONAL ASSOCIATIONS AND MEMBERSHIPS

Royal Society of Chemistry, (Associate Member), UK

American Chemical Society, USA

Materials Research Society, USA

SPIE, USA

Iota Sigma Pi, Honor Society for Women in Chemistry, USA

Texas Society for Microscopy, TX USA

Smalley-Curl Institute, Rice University, USA

Institute of Biosciences and Bioengineering, Rice University, USA

Laboratory for Nanophotonics, Rice University, USA

OTHER INTERESTS

Languages spoken: French (native), English (native), Spanish (beginner)

Sports practiced: Long distance running, Marathon (8)

PUBLICATIONS

H-index: 16, Citations: 2104 (Google Scholar, March 7th, 2017)

Papers published: 40

* Denotes corresponding author

Papers Affiliated with Rice University: 15 published papers

A. Agrawal, A. Singh, S. Yazdi, A. Singh, G. K Ong, K. Bustillo, R. Johns, **E. Ringe**, D. J. Milliron,* “Resonant Coupling between Molecular Vibrations and Localized Surface Plasmon Resonances of Faceted Metal Oxide Nanocrystals”. Accepted in Nano Lett. (2017)

A. S. De Silva Indrasekara, B. Shuang, F. Hollenhorst, B. S. Hoener, A. Hoggard, S. Chen, E. Villarreal, Y.-Y. Cai, L. Kisley, P. J. Derry, W.-S. Chang, E. R. Zubarev, **E. Ringe**, S. Link, C. F. Landes,* “Optimization of Spectral and Spatial Conditions to Improve Super-Resolution Imaging of Plasmonic Nanoparticles”, J. Phys. Chem. Lett. (2017), 8, 299-306

A. Stender, R. Newell, E. Villarreal, D. F. Swearer, E. Bianco, **E. Ringe**,* “Communicating Science Concepts to Individuals with Visual Impairments using Short Learning Modules”, J. Chem. Ed. (2016), 93, 2052-2057

S. Yazdi, J. R. Daniel, N. Large, G. C. Schatz, D. Boudreau, **E. Ringe**,* “Reversible Shape and Plasmon Tuning in Hollow AgAu Nanorods”, Nano Lett. (2016), 16, 6939-6945

I. Bruzas, S. Unser, S. Yazdi, **E. Ringe**, L. Sagle,* “An Ultrasensitive Plasmonic Platform for the Label-Free Detection of Membrane-Associated Species”, Anal. Chem. (2016), 88, 7968-7974

D. F. Swearer, H. Zhao, L. Zhou, C. Zhang, H. Robotjazi, J. M. Martinez, C. M. Krauter, S. Yazdi, M. J. McClain, **E. Ringe**, E. Carter, P. Nordlander, N. J. Halas,* “Heterometallic Antenna-Reactors Complexes for Photocatalysis”, PNAS (2016), 113, 8916-8920

R. K. Leary,* A. Kumar, P. Straney, S. M. Collins, S. Yazdi, R. E. Dunin-Borkowski, P. A. Midgley, J. E. Millstone,* **E. Ringe**,* “Structural and Optical Properties of Discrete Dendritic Pt Nanoparticles on Colloidal Au Nanoprisms”, J. Phys. Chem. C (2016), 120, 20843-20851

Y. Huang, X. Zhang, **E. Ringe**, M. Hou, L. Ma, Z. Zhang* “Tunable Lattice Coupling of Multipole Plasmon Modes and Near-Field Enhancement in Closely Spaced Gold Nanorod Arrays”, Sci. Rep. (2016), 6, 23159

P. Dong, A. Chipara, P. Loya, Y. Yang, L. Ge, S. Lei, B. Li, G. Brunetto, L. Machado, L. Hong, Q. Wang, B. Yang, H. Guo, **E. Ringe**, D. Galvao, R. Vajtai, M. Chipara, M. Tang, J. Lou, P.M. Ajayan,* “A Solid-liquid Self-adaptive Polymeric Composite”, ACS Appl. Mater. Inter. (2016), 8, 2142-2147

G. R. Bhimanapati, Z. Lin, V. Meunier, J. Cha, S. Das, D. Xiao, M. Strano, V. Cooper, L. Liang, S. G. Louie, **E. Ringe**, W. Zhou, B. G. Sumpter, H. Terrones, F. Xia, J. Zhu, D. Akinwande, N. Alem, J. Schuller, R. Schaak, M. Terrones, J. A. Robinson,* “Recent Advances in 2D Materials Beyond Graphene”, ACS Nano (2015), 9, 11509-11539

C.P. Byers, H. Zhang, D. F. Swearer, M. Yorulmaz, B. S. Hoener, D. Huang, A. Hoggard, W.-S. Chang, P. Mulvaney, **E. Ringe**, N. J. Halas, P. Nordlander, S. Link,* C. F. Landes,* “From Tunable Core-Shell Nanoparticles to Plasmonic Drawbridges: Active Control of Nanoparticle Optical Properties”, Science Adv. (2015), 1, e1500988

Y. Huang, **E. Ringe**,* M. Hou, L. Ma, Z. Zhang,* “Near-Field Mapping of the Surface Charge Poles in Hybridized Plasmonic Nanostructures”, AIP Adv. (2015), 5, 107221

M. J. McClain, A. E. Schlather, **E. Ringe**, N. S. King, Nicholas, L. Liu, A. Manjavacas, M. W. Knight, I. Kumar, K. H. Whitmire, H. O. Everitt, P. Nordlander, N. J. Halas,* “Aluminum Nanocrystals”, Nano Lett. (2015), 15, 2751-2755

E. Ringe,* “Nanocrystalline Materials: Recent Advances in Crystallographic Characterization Techniques”, IUCrJ Invited Feature Article (2014), 1, 530-539

X. Wang, Y. Gong, G. Shi, W. L. Chow, K. Keyshar, G. Ye, R. Vajtai, J. Lou, Z. Liu, **E. Ringe**,* B. K. Tay,* P. M. Ajayan* “Chemical Vapor Deposition Growth of Crystalline Monolayer MoSe₂”, ACS Nano (2014), 8, 5125-5131

Postdoctoral work: 4 published papers

E. Ringe,* C. J. DeSantis, S. M. Collins, M. Duchamp, R. E. Dunin-Borkowski, S. E. Skrabalak, and P. A. Midgley, “Resonances of Nanoparticles with Poor Plasmonic Metal Tips”, Sci. Rep. (2015), 5, 17431

S. M. Collins, **E. Ringe**, M. Duchamp, Z. Saghi, R. E. Dunin-Borkowski, P. A. Midgley,* “Surface Charge Tomography of Plasmonic Eigenmodes of Metal Nanoparticles”, ACS Photonics (2015), 2, 1628-1635

E. Ringe,* C. J. DeSantis, S. M. Collins, S. E. Skrabalak, P. A. Midgley, “Plasmon and Compositional Mapping of Au/Pd Nanostructures”, Proc. SPIE (2014), 9278, Plasmonics, 92780J

B. R. Knappett, P. Abdulkin, **E. Ringe**, D. A. Jefferson, S. Lozano-Perez, C. Rojas-Ruiz, A. Fernández, A. E. H. Wheatley,* “Characterisation of Co@Fe₃O₄ Core@shell Nanoparticles Using Advanced Electron Microscopy”, *Nanoscale*, (2013), 5, 5765-5772, **Back Cover**

Ph. D. work: 18 published papers

L. Peng, **E. Ringe**, R. P. Van Duyne, L. D. Marks,* “Segregation in Bimetallic Nanoparticles”, *Phys. Chem. Chem. Phys.* (2015), 17, 27940-27951

E. Ringe,* R. P. Van Duyne, L. D. Marks, “Correlated Structure-Optical Properties Studies of Plasmonic Nanoparticles”, *J. Phys. Conf. Ser.* (2014), 522, 012006

E. Ringe,* R. P. Van Duyne, L. D. Marks, “Kinetic and Thermodynamic Modified Wulff Constructions for Twinned Nanoparticles”, *J. Phys. Chem. C* (2013), 117, 15859-15870 **Cover & Feature Article**

Y. J. Shin, **E. Ringe**, M. L. Personick, M. F. Cardinal, C. A. Mirkin, L. D. Marks, R. P. Van Duyne, M. C. Hersam,* “Centrifugal Shape Sorting and Optical Response of Polyhedral Gold Nanoparticles”, *Adv. Mater.* (2013), 25, 4023-4027

E. Ringe,* A.-I. Henry, B. Sharma, L. D. Marks, R. P. Van Duyne “Single Nanoparticle Plasmonics”, *Phys. Chem. Chem. Phys.* (2013), 15, 4110-4129 **Cover & Top 10 Most Accessed Article, March 2013**

A. Mesbah, **E. Ringe**, S. Lebègue, R. P. Van Duyne, J. A. Ibers,* “Ba₂An(S₂)₂S₂ (An = U, Th): Syntheses, Structure, Optical and Electronic Properties”, *Inorg. Chem.* (2012), 51, 13390-13395

E. Ringe,* J. Zhang, M. R. Langille, C. A. Mirkin, L. D. Marks, R. P. Van Duyne, “Correlating the Structure and Localized Surface Plasmon Resonance of Single Silver Right Bipyramids”, *Nanotechnology* (2012), 13, 444005

L. Koscielski, **E. Ringe**, R. P. Van Duyne, D. E. Ellis, J. A. Ibers,* “Single-Crystal Structures, Optical Absorption, and Electronic Distributions of Thorium Oxychalcogenides ThOQ (Q = S, Se, Te)”, *Inorg. Chem.* (2012), 51, 8112-8118

E. Ringe,* M. R. Langille, K. N. Sohn, J. Huang, C. A. Mirkin, R. P. Van Duyne, L. D. Marks, “Plasmon Length: A Universal Parameter to Describe Size Effects in Gold Nanoparticles”, *J. Phys. Chem. Lett.* (2012), 3, 1479-1483

E. Ringe,† A. Grubisic,† C. Cobley, Y. Xia, L. D. Marks, R. P. Van Duyne,* D. J. Nesbitt,* “Plasmon Near-Electric Field Enhancement Effects in Ultrafast Photoelectron Emission: Correlated Spatial and Laser Polarization Microscopy in Individual Ag Nanocubes”, *Nano Lett.* (2012), 12, 4823-4829

†These authors contributed equally

B. Sharma, R. R. Frontiera, A.-I. Henry, **E. Ringe**, R. P. Van Duyne,* “SERS: Materials, Applications, and the Future”, *Mater. Today* (2012), 15, 16-25

G. Oh, **E. Ringe**, R. P. Van Duyne, J. A. Ibers,* “Synthesis, Structure, and Optical Properties of CsU₂(PO₄)₃”, *J. Solid State Chem.* (2012), 185, 124-129

E. Ringe,* R. P. Van Duyne, L. D. Marks, “Wulff Construction for Alloy Nanoparticles”, *Nano Lett.* (2011), 11, 3399-3403. **Science Editor's Choice, Aug. 5, 2011**

S. L. Kleinman, **E. Ringe**, N. Valley, K. L. Wustholz, E. Phillips, K. A. Scheidt, G. C. Schatz, R. P. Van Duyne,* “Single-Molecule Surface-Enhanced Raman Spectroscopy of Crystal Violet Isotopologues: Theory and Experiment”, *J. Am. Chem. Soc.* (2011), 133, 4115-4122

A.-I. Henry, J. M. Bingham, **E. Ringe**, L. D. Marks, G. C. Schatz, R. P. Van Duyne,* “Correlated Structure and Optical Property Studies of Plasmonic Nanoparticles”, *J. Phys. Chem. C* (2011), 115, 9291-9305, **Cover & Feature Article**

P. Li, C. L. Stender, **E. Ringe**, L. D. Marks, T. W. Odom,* “Synthesis of TaS₂ Nanotubes From Ta₂O₅ Nanotube Templates”, *Small* (2010), 6, 1096-1099

E. Ringe, J. M. McMahon, K. N. Sohn, C. Cobley, Y. Xia, J. Huang, G. C. Schatz, L. D. Marks, R. P. Van Duyne,* “Unraveling the Effects of Size, Composition, and Substrate on the Localized Surface Plasmon Resonance Frequency of Gold and Silver Nanocubes: A Systematic Single Particle Approach”, *J. Phys. Chem. C* (2010), 114, 12511-12516

E. Ringe, J. Zhang, M. R. Langille, K. N. Sohn, C. Cobley, L. Au, Y. Xia, C. A. Mirkin, J. Huang, L. D. Marks, R. P. Van Duyne,* “Effect of Size, Shape, Composition, and Support Film on Localized Surface Plasmon Resonance Frequency: A Single Particle Approach Applied to Silver Bipyramids and Gold Nanocubes”, *Mat. Res. Soc. Symp. Proc.* (2010), 1208-O10-02

Undergraduate work: 3 published papers

D. M. Wells, **E. Ringe**, D. Kaczorowski, G. Andre, D. E. Ellis, J. A. Ibers,* “Structure, Properties, and Theoretical Electronic Structure of UCuOP and NpCuOP”, *Inorg. Chem.* (2011), 50, 576-589

G. B. Jin, **E. Ringe**, G. J. Long, F. Grandjean, M. T. Sougrati, E. S. Choi, D. M. Wells, M. Balasubramanian, J. A. Ibers,* “Structural, Electronic, and Magnetic Properties of UFeS₃ and UFeSe₃”, *Inorg. Chem.* (2010), 49, 10455-10467

E. Ringe, J. A. Ibers,* “Partial Cu Occupancy in Uranium Copper Diantimonide, UCu_{0.60(4)}Sb₂”, *Acta Crystallogr. Sect. C Cryst. Struct. Comm.* (2008), 64, i76-i78