David Mitlin

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Clarkson University
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Potsdam, NY 13699

Ph.D. **University of California at Berkeley**, Materials Science, December 2000
M.S. **The Pennsylvania State University**, Materials Science, December 1996
B.S. **Rensselaer Polytechnic Institute**, Materials Engineering, *Cum-Laude*, May 1995

Technical Expertise: Electrochemical and Chemical Energy Storage (batteries, supercapacitors, hybrid devices, metal hydrides), Thin Films, Materials Design, TEM, Corrosion

Professor and General Electric Chair, Clarkson University

07/2014 – current
Chemical & Biomolecular Engineering and Mechanical Engineering

- Develop funding grant applications, supervise graduate students and undergraduates, collaborate with external partners including Oak Ridge National Laboratory and Sandia National Laboratory, publish peer reviewed manuscripts and patents.
- Google Scholar h-index at 44, with > 1500 citations per year. Total publications 135.

https://scholar.google.com/citations?user=hS5K8A8AAAAJ&hl=en&oi=ao

- Co-organizer of 2017 Spring MRS Symposium: Interfaces and Interphases in Electrochemical Energy Storage and Conversion.
- Co-organizer of 2018 Spring MRS Symposium: Capacitive Energy Storage—Fundamentals, Materials and Devices
- Elected Board Member NY-BEST, 2017 – current.
- Holds 5 granted U.S. patents, 3 of them licensed.
- Co-founder of a carbon materials startup, CQuest Partners LLC. https://cquestpartners.com/.

U.S. Funded Proposals (cash, does not include in-kind)

6. High Rate Sodium Storage Mechanisms in Non-Graphitic Carbons, DOE Basic Energy Sciences (BES), $ 570K total over 3 yrs., *renewable*, Mitlin (PI) with E. Paek, Award # DE-SC0018074, start date 08/01/2017.

5. Manganese Oxide-Carbon Nanosheet Anodes for Extreme High Power Lithium Ion Batteries, NSF Phase I SBIR/STTR, $ 127K out of $ 225 K total over 1 yr., Mitlin (university PI), tentative start date 08/01/2018.

4. Manganese Oxide-Carbon Nanosheet Anodes for Extreme High Power Lithium Ion Batteries, NYSERDA, Energy Storage Technology & Product Development Program Opportunity Notice(PON) 3585, $ 200 K over 1.5 yrs., Mitlin (single applicant), tentative start date 09/01/2018.

3. Research and Development pilot plant and battery fabrication facility, NYS Regional Economic Development Councils REDC competition, $ 229K, Mitlin (university PI) with CQuest Partners LLC.

2. TASK 2016-02; Energy Storage Systems Phase I, New York Air Brake Corp. with NYS matching, Mitlin (single applicant), $ 50 K.

1. CQuest Carbons; NEXUS-NY | Clean Energy Seed Accelerator, NYS, Mitlin (single applicant), $ 70K.

Associate Editor, Sustainable Energy and Fuels, Royal Society of Chemistry
01/2017 – current

Editor, Journal of Materials Science, Springer
01/2007– 12/2016

Clarkson Teaching Experience
Below is the summary of the courses that I have taught at Alberta, in reverse chronological order. Also listed are the median course and instructor evaluations, which are based on a 1 - 5 point system, with 5 being the highest, i.e. student strongly agrees with the statement.

ES340 Thermodynamics (8029), Third year undergraduate service course.
Fall 2017: 44 students registered / 41 questionnaires returned
Rating: instructor was excellent: 4.6, quality of the course content was excellent: 4.4

MSE 560-01 (3148) Adv Mat Sci & Engineering, Graduate course.
Spring 2017: 8 students registered / 8 questionnaires returned
Rating: instructor was excellent: 4.87, quality of the course content was excellent: 4.87

ES 464/ES 564 Corrosion of Metals, Fourth year undergraduate and graduate course.

Spring 2018: 23 students registered / 20 questionnaires returned
Rating: instructor was excellent: 4.5, quality of the course content was excellent: 4.4
Spring 2016: 25 students registered / 24 questionnaires returned
Rating: instructor was excellent: 4.2, quality of the course content was excellent: 4.3
Spring 2015: 24 students registered / 22 questionnaires returned
Rating: instructor was excellent: 4.1, quality of the course content was excellent: 4.3

MSE 551-01 Adv Materials Characterization. Graduate course.

Fall 2016: 4 students registered / 4 questionnaires returned
Rating: instructor was excellent: 5, quality of the course content was excellent: 5
Fall 2015: 4 students registered / 4 questionnaires returned
Rating: instructor was excellent: 4.75, quality of the course content was excellent: 4.75

University of Alberta

Professor, University of Alberta
06/2004 – 06/2014
Chemical & Materials Engineering

- *Secured over 8.0 million dollars (cash to PI)* in research grants from the federal government, the province and from industry. Successfully fund and lead a group of 9 graduate students and 1 post-doc.
- Promoted from Associate Professor to Professor on 07/01/12. Promoted from Research Officer to Principal Research Officer to on 12/18/11. Promoted from Assistant Professor to Associate Professor on 07/01/08.
- *Published 100 peer-reviewed journal manuscripts (~125 career total) and 3 U.S. Patents.* While at Alberta H-index (Scholar) grown from 4 to 26 *(current 39)*.
- Graduated 13 Ph.D. students, 5 M.S. students and 8 post docs.
- Serve as Editor for Journal of Materials Science, Board of Review Member for Metallurgical Transactions, Proposal Referee for Sandia National Laboratory CINT User Program.
- Presented > 100 Invited, Keynote or Plenary talks at international conferences and meetings.
- Invited member of the TMS Content Development and Dissemination Committee (TMS Executive Board).
- Organize and Chair the Materials Aspects of Corrosion and Fouling in Oil Refining and Exploration Symposium at the TMS Annual Meeting 2014, onwards.
- Organizer and Chair the Nanostructured Materials for Lithium Ion Batteries and for Supercapacitors Symposium at the TMS Annual Meeting 2013, 2014, 2015.
- Organizer and Chair the Challenges and Opportunities in Petroleum Oil Production, Refining and Utilization at the 248th ACS National Meeting, 2014.
- Spin off corrosion-fouling microsensor company (Phasesensors www.phasesensors.com) that is being headed by a former graduate student and is based on work done for his Ph.D.
- Spin off electrochemical supercapacitor company (Alta Supercaps http://www.altasupercaps.com/) that is focused on resource-exploration related portable energy storage.

Technical Activity at Alberta

1. Supercapacitors and Lithium Ion Batteries. We are using a variety of nanoscience approaches to create improved electrochemical capacitors and lithium ion battery electrodes. A key theme to our research is "green methods" which include low-energy environmentally friendly synthesis routes combined with materials precursors derived from agricultural and industrial wastes. A second theme to our approach is materials design of electrodes and devices for extreme environments.

2. Corrosion-Fouling of Surfaces. This is an ongoing industrially sponsored consortium (Phillips66, Champion, BP, and Statoil) that aims to explain the fundamentals of elevated-temperature corrosion fouling behaviour of metal surfaces in refinery environments. The program has met significant success during its first 3 year funding cycle and is now being renewed with an expanded scope.

3. Oxygen Reduction Reaction Electrodes. One of our primary thrusts is on creating hybrid oxide – nanocarbon supports for Pt that enable tremendously improved corrosion resistance coupled promising electrochemical activity. In parallel we are utilizing a thin films alloy design approach to create improved multicomponent Pt-based alloys with outstanding ORR activity and cycling stability.

4. Hydrogen Storage in Thin Films and Multilayers. In the past we have had tremendous success in designing new catalysts for accelerating the hydrogenation kinetics, and in using TEM to explain the key microstructural features responsible for this effect. Currently we are focused, with significant success demonstrated already, on creating alloys with favorably altered thermodymanics.

5. Metallic MEMS. We have developed a series of ultra-strong corrosion-resistant Al, Cu, Au, and Ni-based alloy films and are incorporating them into MEMS devices used for sensing in oil wells. The project is in the commercialization stage with a start-up partner (DataCan).

Alberta Start Up Companies

- Alta Supercaps (http://www.altasupercaps.com/): D. Mitlin has formed a start-up focused on providing competitively priced value-added supercapacitors to directly compete in existing and emerging supercapacitor markets including consumer electronics and hardware, oil/gas/mining exploration and high-temperature downhole environments. Alta Supercaps has passed AITF NanoBridge Proof of Concept stage ($ 75,000) and is now competing for Alpha Stage prototype funding.

- Phasesensors (http://phasesensors.com/): Chris Holt, who is a recently graduated Ph.D. student from the Mitlin group, has formed a start-up focusing on microfabricated portable corrosion-fouling sensors for the oil and gas industry. The company technology is based on work performed during his Ph.D. project on fabricated downhole oil well sensing. Phasesensors has received initial funding nanoBridge MNTorship Buisness Plan Competition First Place $75,000, AVCatalyst Workshop MNT category Competition First Place $2,000, AVCatalyst Business Plan Competition First Place $10,000, TEC Edmonton VenturePrize Student Competition Finalist $7,500.

Previous Work Experience

MST-8, Structure-Properties Group, Los Alamos National Laboratory *07/2002 - 06/2004*
Director's Funded Postdoctoral Fellow

Utilized TEM to investigate the origin and the structure of epitaxial dislocations in nanolayered composites. Collaborated with modeling experts in explaining deformation, strengthening mechanisms and coherency loss in nanocomposites. Employed UHV synthesis methods to create unique metallic alloy thin films with exceptional mechanical properties.

IBM Corp., SRDC, Hopewell Junction, NY *01/2001 - 07/2002*
Integration Engineer

Served as the lead design integrator for Advanced Logic Back-End-Of-The-Line (BEOL) Development. Managed test-sites. The development cycle started from the initial conception, and continued all the way through to reticle tapeout and mask inspection. Designed unique test-macros and performed layout. Wrote and implemented custom RET's. Lead interconnect and packaging failure analysis projects.

Lawrence Berkeley National Laboratory, U.C. Berkeley *01/1997 - 12/2000*
Graduate Student

Developed a new class of structural alloys based on the Al-Cu-Si-Ge system. These alloys require very short heat treatments, while maintaining excellent strength and high temperature stability. Investigated precipitation mechanisms, strengthening and aging using TEM analysis and continuum mechanics.

Independent Materials Consultant *09/1997 - 12/2000*

Used microscopy to solve failure analysis and manufacturing problems. Past projects include the creation and implementation of a complete TEM-based CMP-slurry quality control process for AMD.

Alberta Teaching Experience

Below is the summary of the courses that I have taught at Alberta, in reverse chronological order. Also listed are the median course and instructor evaluations, which are based on a 1 - 5 point system, with 5 being the highest, i.e. student strongly agrees with the statement.

MATE 345 Corrosion and Oxidation, 3rd and 4th year undergraduate course. Until 2009 it was a required course. Afterward it became an elective.
Spring 2012: 14 students registered / 12 questionnaires returned
Rating: instructor was excellent: 4.8, quality of the course content was excellent: 4.2
Spring 2011: 14 students registered / 13 questionnaires returned
Rating: instructor was excellent: 4.4, quality of the course content was excellent: 4.1
Spring 2010: 14 students registered / 13 questionnaires returned
Rating: instructor was excellent: 3.9, quality of the course content was excellent: 3.8
Spring 2009: 30 students registered / 29 questionnaires returned
Rating: instructor was excellent: 4.0, quality of the course content was excellent: 3.8
Spring 2008: 45 students registered / 32 questionnaires returned
Rating: instructor was excellent: 3.3, quality of the course content was excellent: 3.3

This course focused on theory and application of electrochemical corrosion. Throughout the four years of instructing this course I implemented several positive changes to the curriculum including four new in-class demonstrations based on a combination of NACE literature and our own research. Other changes included an increasing emphasis on electrochemical thermodynamics and a merging of the applied corrosion kinetic sections with general electrode kinetics theory.

MATE 335 Phase Transformations I, 3rd and 4th year undergraduate course.
Winter 2013: 38 students registered / 34 questionnaires returned
Rating: instructor was excellent: 3.2, quality of the course content was excellent: 3.7
Winter 2012: 37 students registered / 31 questionnaires returned
Rating: instructor was excellent: 3.2, quality of the course content was excellent: 3.7

This was a new solid-state phase transformations course that is required for all Materials undergraduates. The course material focuses on phase transformations in steels and in aluminum alloys, with an emphasis on defects and their role in altering the reaction kinetics. There is a substantial crystallography component to this course and well as an "end point" emphasis on alloy design.

MATE 665 TEM Analysis of Materials, course for graduate students
Winter 2014: 19 students registered / 17 questionnaires returned
Rating: instructor was excellent: 4.7, quality of the course content was excellent: 4.7
Winter 2012: 19 students registered / 17 questionnaires returned
Rating: instructor was excellent: 4.7, quality of the course content was excellent: 4.7
Winter 2010: 8 students registered / 6 questionnaires returned
Rating: instructor was excellent: 4.1, quality of the course content was excellent: 3.9
Winter 2008: 12 students registered / 10 questionnaires returned
Rating: instructor was excellent: 3.5, quality of the course content was excellent: 3.5

This course focused on the theory and applications of transmission electron microscopy (TEM). In prior years the course had a primary focus on metallurgical applications and user instrumentation. I changed the emphasis of the class toward an applied physics approach, emphasizing microscopy theory and quantitative defect analysis. I also developed several new hands-on laboratories including one on dark field / bright field analysis of grain sizes and precipitates and on weak beam dark field analysis of dislocation Burgers vector.

MAT E 654 - Electrochemical Theory of Corrosion
Graduate – level course of the fundamental aspects of corrosion.

Spring 2011: 14 students registered / 13 questionnaires returned
Rating: instructor was excellent: 4.4, quality of the course content was excellent: 4.3

This new course focused on the advanced theory and application of electrochemical corrosion. I structured the course material based on a combination of "textbook" topics and my group's research in the field.

MATE 256 Materials Engineering, first materials course for materials engineers
25 students registered / 23 questionnaires returned
Rating: instructor was excellent: 4.4, quality of the course content was excellent: 4.1

Materials Engineering focused on two critical aspects of materials science and on their interrelation: defects in materials and materials characterization. To effectively teach this course I incorporated "active learning" in the form of in-class discussions, in-class problems and group work. While the themes of the course remained the same as in previous years, I included new topics that emphasized modern analytical techniques, particularly pertinent to their future line of work. For example, since many of the Alberta graduates will be involved in oil and corrosion related engineering, I included an extended section on environmental scanning electron microscopy. I also restructured the order of the topics to emphasize the suitability of a particular technique for understanding specific microstructural features. For example, I moved the section on x-ray analysis to follow the section on materials crystallography. The section on TEM analysis now follows the sections on dislocations, stacking faults and twins.

MAT E 452 Applications of Physical Metallurgy, 3rd and 4th year undergraduate course
35 students registered / 22 questionnaires returned
Rating: instructor was excellent: 4.5, quality of the course content was excellent: 3.9

This course focused on applications of physical metallurgy, including alloy design and selection, and aspects of mechanical forming of metals. I incorporated "active learning" as well as "Alberta-related" application examples into the course curriculum. I also included extensive linear algebra and tensor notation in many of the sections, and hence challenged the students on the fundamentals. The laboratory component of this course was restructured to reflect an emphasis on general microstructural design. I felt that this was a key skill for materials engineering graduates, which was previously absent from the laboratory curriculum. The alloy design sections of the laboratory consisted of optimizing the cold-work/heat treatment sequence for several commercial non-aged aluminum alloys.

MATE 667 Advanced Physical Metallurgy, graduate course
13 students registered / 12 questionnaires returned
Rating: instructor was excellent: 4.1, quality of the course content was excellent: 4.1

I created this new course, which focused on dislocation theory. We also discussed a variety of applications, ranging from coherency loss in semiconductor layers, to particle shearing and bypass in precipitation-hardened alloys. Though the topics were often abstract and mathematical, the majority of the graduate students were able to handle the content. The subjects were taught using a variety of source texts, including Theory of Dislocations by Hirth and Lothe.

MATE 660 Crystallography and Diffraction in Materials Science, graduate course
11 students registered / 10 questionnaires returned
Rating: instructor was excellent: 4.8, quality of the course content was excellent: 4.7

This is a course that I developed, which is now part of the standard Alberta Graduate Materials Engineering curriculum. The course drew from several advanced chemistry and crystallography texts, covering many subjects directly relevant to graduate-level research. The unique theme of this course was the emphasis on quantitative crystallography and space group theory, where throughout the semester the students would work directly with the International Tables for Crystallography. Almost everyone felt that they benefited tremendously from this approach, since these topics were generally not covered in most materials science x-ray courses but were essential for research. I also incorporated hands-on crystallography/diffraction pattern simulation into the curriculum, using a cluster of workstations equipped with Desktop Microscopist ™, Crystal Kit ™ and MacTempas ™.

MATE 252 Materials Science, service course offered to all undergraduates
Fall 2005: 100 students registered / 81 questionnaires returned
Rating: instructor was excellent: 2.9, quality of the course content was excellent: 3.2
Winter 2005: 96 students registered / 66 questionnaires returned
Rating: instructor was excellent: 3.5, quality of the course content was excellent: 3.4

This is the general “introduction to materials science” course required of all engineering students in their second year. It was also my first course taught at the University or anywhere else.

Awards and Honors

- TMS Young Leader Professional Development Award, *2013*
- Petro-Canada Young Innovator Award, *2007*
- Outstanding Instructor Recognition, *spring 2006*
- Los Alamos Director Postdoctoral Fellowship, *awarded to top 5% of post-docs, 2002*

Students Graduated

Doctoral

13) Jia Ding, *Ph.D. Summer 2015*. Jia is finishing his post-doctoral research with Stanley Whittingham at Binghamton University, and is interviewing for faculty positions.

12) Tyler Stephenson, *Ph.D. Fall 2015*. Tyler is a Staff Engineer at University of Calgary.

11) XueHai Tan, *Ph.D. Fall 2014*. XueHai is a post doc at New Jersey Institute of Technology.

10) Alireza Kohandehghan, *Ph.D. Fall 2014*. Alireza is a Lead Materials Engineer at SGS.

9) Elmira Memarzadeh Lotfabad, *Ph.D. Summer 2014*. Elmira is a Research Scientist at Electrovaya.

8) Chris Harrower, *Ph.D. Fall 2013.* Chris is a Senior Test Engineer Aversan Inc., Toronto, ON,

7) Chris Holt, *Ph.D. Spring 2013*. Chris is the Owner of Phasesensors (http://phasesensors.com/), a Mitlin - group spin-off focusing on microfabricated portable corrosion-fouling sensors for the oil and gas industry.

6) Beniamin Zahiri, *Ph.D. Fall 2012.* Ben is a Staff Engineer at AFCC, Vancouver BC, Canada.

5) Erik Luber, *Ph.D. Fall 2011.* Erik is a Staff Engineer UofA/NINT NRC Edmonton, AB.

4) Babak Shalchi, *Ph.D. Spring 2011*. Babak is a Research Microscopist at CANMET Hamilton, ON.

3) Mohsen Danaie, *Ph.D. Fall 2010*. Mohsen was a Staff Microscopist at McMaster University's Brockhouse Institute for Material Research Hamilton, ON, and is now at Oxford.

2) Colin Ophus *Ph.D. Spring 2010*. Colin is a Staff Scientist at NCEM in Lawrence Berkeley National Laboratory.

1) Reza Mohammadi *Ph.D. Spring 2007*. Reza is an Assistant Professor in the Department of Mechanical and Nuclear Engineering, Virginia Commonwealth University.

Masters

5) Behdokht Farbod, *M.S. Fall 2014*. Behdokht is an Integrity Project Manager at Enbridge Gas Distribution

4) Ramin Zahiri, *M.S. Fall 2012*. Ramin works as a Research and Development Engineer at Black Cat Blades Ltd. Edmonton, AB.

3) Brian Olsen *M.S. Spring 2011*. Brian is a Staff Engineer at University of Alberta.

2) Julian Haagsma *M.S. Spring 2011*. Julian is an Engineer employed for Phasesensors.

1) Sean Murphy *M.S. Spring 2009*. Sean is a Senior R&D Engineer for Sage Electrochromics, Minneapolis, MN.

Post Docs

8) Huanlei Wang, *Spring 2014*. Huanlei is an Associate Professor, Ocean University of China, Shandong, China.

7) Zhanwei Xu, *Spring 2014*. Zhanwei is an Associate Professor, Northwestern Polytechnical University, Shaanxi, China.

6) Peter Kalisvaart, *Spring 2014*. Peter is a Lab Manager, Clean Energy Research Centre, The University of British Columbia, Vancouver, BC.

5) Yang Xu, *Fall 2013*. Yang Humboldt Research Fellow, Ilmenau University of Technology, Germany.

4) Cecil K. King'ondu, *Fall 2013*. Cecil is an Associate Professor at Nelson Mandela African Institution of Science and Technology, Tanzania.

3) Li Zhang, *Spring 2012*. Li is an Associate Professor at the School of Energy (SOE), Soochow University, Jiangsu, China.

2) Huatao Wang, *Spring 2011*. Huantao is an Associate Professor at Harbin Institute of Technology (Weihai) Shandong, China.

1) Jian Chen, *Spring 2007*. Jian is a Staff Microscopist at NINT NRC, Edmonton, AB.

Service: **External**

11/2013 - present: Invited member of the TMS Content Development and Dissemination Committee (TMS Executive Board).

08/2013 - present: Organizer and Chair the Challenges and Opportunities in Petroleum Oil Production, Refining and Utilization at the 248th ACS National Meeting, 2014.

03/2013 - present: Organizer and chair of the Materials Aspects of Corrosion and Fouling in Oil Refining and Exploration Symposium at the TMS Annual Meeting 2014.

03/2012 - present: Organizer and chair of the Nanostructured Materials for Lithium Ion Batteries and for Supercapacitors Symposium at the TMS Annual Meeting 2013, 2014, 2015.

01/2008 - present: Editor, Journal of Materials Science

01/2008 - present: User Proposal Reviewer, Sandia-LANL CINT

03/2007 – present: Board of Review Member, Metallurgical and Materials Transactions

09/2006 Session-Organizer and Session Chair: The 57th Canadian Chemical Engineering Conference- Nanomaterials Symposia

03/2006 – 01/2007: President, Alberta Section of the Canadian Microscopy Society

09/2004 – 01/2007: Invited member, The Metallurgical Society of AIME Nanomechanical Material Behavior Committee

09/2004 – 01/2007: Invited member, COM Materials Education Council

09/2005: Poster Session Organizer, Conference of Metallurgists (COM) 2005

01/1995 – present: Member of Materials Research Society (MRS) and The Minerals, Metals & Materials Society (TMS)

Service: **University of Alberta**

09/2007 – 09/2009: Faculty of Engineering's Publicity and Awards Committee

09/2006 – 09/2008: Faculty Search Committee

09/2005 – 09/2007: Materials Curriculum Committee

09/2005 – 09/2007: Nanotechnology Curriculum Committee

09/2005 – 09/2009: Third Year Student Advisor

Invited, Keynote or Plenary Presentations since 2004

108. *Invited*. D. Mitlin, Selenium impregnated monolithic carbons as cathodes for high volumetric energy lithium and sodium metal batteries, *Li-SM³ 2018 Conference*, Chicago, IL, April 2018.

107. *Invited*. D. Mitlin, Selenium impregnated monolithic carbons as cathodes for high volumetric energy lithium and sodium metal batteries, *MRS Spring Meeting*, Phoenix, AZ, April 2018.

106. *Invited*. D. Mitlin, Selenium impregnated monolithic carbons as cathodes for high volumetric energy lithium and sodium metal batteries, *Cornell MSE Seminar*, Ithaca, NY, March 2018.

105. *Invited*. D. Mitlin, Selenium impregnated monolithic carbons as cathodes for high volumetric energy lithium and sodium metal batteries, *CINT Sandia Seminar*, Albuquerque, NM, January 2018.

104. *Invited*. D. Mitlin, Selenium impregnated monolithic carbons as cathodes for high volumetric energy lithium and sodium metal batteries, *Nanjing Tech Seminar Series*, Jiangsu, China, November 2017.

103. *Invited*. D. Mitlin, Exceptional Energy and New Insight with Sodium – Selenium Battery based on Carbon Nanosheet Cathode and Pseudographite Anode, *NASA Langley Research Center,* Langley, VA, August 2017.

102. *Invited*. D. Mitlin, Unrivaled combination of surface area and pore volume in micelle-templated carbon for supercapacitor energy storage, *ACS National Meeting,* Washington, DC, August 2017.

101. *Invited*. D. Mitlin, Exceptional Energy and New Insight with Sodium – Selenium Battery based on Carbon Nanosheet Cathode and Pseudographite Anode, *ACS National Meeting,* Washington, DC, August 2017.

100. *Invited*. D. Mitlin, Exceptional Energy and New Insight with Sodium – Selenium Battery based on Carbon Nanosheet Cathode and Pseudographite Anode, *Nanjing Tech Seminar Series*, Jiangsu, China, June 2017.

99. *Invited*. D. Mitlin, Exceptional Energy and New Insight with Sodium – Selenium Battery based on Carbon Nanosheet Cathode and Pseudographite Anode, *Sichuan University Seminar Series*, Sichuan, China, June 2017.

98. *Plenary.* D. Mitlin, Exceptional Energy and New Insight with Sodium – Selenium Battery based on Carbon Nanosheet Cathode and Pseudographite Anode, *2nd International Forum on Graphene and other 2D Material*, Chengdu, Sichuan, China, June 2017.

97. *Invited*. D. Mitlin, Thiophene Mitigates High Temperature Fouling of Metal Surfaces in Oil Refining*, BP's Reaction Chemistry Network Workshop*, Naperville, IL, May 2017.

96. *Invited*. D. Mitlin, Exceptional Energy and New Insight with Sodium – Selenium Battery based on Carbon Nanosheet Cathode and Pseudographite Anode, *Navy Research Laboratory Seminar*, Washington, DC, May 2017.

95. *Invited*. D. Mitlin, Exceptional Energy and New Insight with Sodium – Selenium Battery based on Carbon Nanosheet Cathode and Pseudographite Anode, *Dalian Institute of Chemical Physics Seminar*, Dalian, Liaoning, China, April 2017.

94. *Invited*. D. Mitlin, Coupling in-situ TEM and ex-situ analysis to understand heterogeneous sodiation of antimony, *MRS Fall Meeting*, Boston MA, December 2016.

93. *Keynote.* Coupling in-situ TEM and ex-situ analysis to understand heterogeneous sodiation of antimony, *Taishan Academic Forum*, Qingdao University, Qingdao, Shandong, China, November 2016.

92. *Keynote.* Peanut Shell Hybrid Sodium Ion Capacitor with Extreme Energy - Power Rivals Lithium Ion Capacitors, *MS&T16 Materials Science and Technology*, Salt Lake City, UT, October 2016.

91. *Invited Panel.* Carbon Nanosheets for Energy Storage Applications, *NY-BEST Energy Storage Technology Conference*, Syracuse, NY, October 2016.

90. *Keynote.* D. Mitlin, Coupling in-situ TEM and ex-situ analysis to understand heterogeneous sodiation of antimony, *ACS Northeast Regional Meeting*. Binghamton, October 2016.

89. *Invited.* D. Mitlin, CQuest Partners LLC. Overview, *NY-BEST Energy Storage Investment Conference 2016*. New York City, September 2016.

88. *Plenary.* D. Mitlin, High Performance Energy Storage Carbons from Agricultural Byproducts, *First Western China International Forum on Graphene and Related Materials for Energy and Conversion*, Chengdu, China, August 2016.

87. *Invited.* Coupling in-situ TEM and ex-situ analysis to understand heterogeneous sodiation of antimony, *2016 ACS Annual Meeting, Philadelphia PA,* August 2016.

86. *Keynote* D. Mitlin, Graphene – Like Carbon Nanosheets from Hemp Fiber and High Performance Activated Carbons from Eggs, *2016 Clean Energy Economy Conference, Utica NY*, June 2016.

85. *Invited* D. Mitlin, Coupling in-situ TEM and ex-situ analysis to understand heterogeneous sodiation of antimony, *Yale University Seminar Series,* New Haven CT, May 2016.

84. *Invited* D. Mitlin, Coupling in-situ TEM and ex-situ analysis to understand heterogeneous sodiation of antimony (invited poster), *CINT Sandia Biannual DOE Review,* Los Alamos NM, May 2016.

83. *Invited* D. Mitlin, Coupling in-situ TEM and ex-situ analysis to understand heterogeneous sodiation of antimony, *University of Central Florida Seminar Series, Orlando NY*, March 2016.

82. *Invited* D. Mitlin, Coupling in-situ TEM and ex-situ analysis to understand heterogeneous sodiation of antimony, *Materials Challenges in Alternative Renewable Energy (MCARE 2016), Clearwater FL*, April 2016.

81. *Invited* D. Mitlin, Coupling in-situ TEM and ex-situ analysis to understand heterogeneous sodiation of antimony, *Alfred University Seminar Series, Alfred NY*, March 2016.

80. *Invited* D. Mitlin, Carbon-based Sodium Ion Battery Electrodes (invited panel speaker), *NYBEST Annual Conference and Meeting, Albany NY*, March 2016.

79. *Invited* D. Mitlin, Coupling in-situ TEM and ex-situ analysis to understand heterogeneous sodiation of antimony, *Stony Brook University Seminar Series, Stony Brook NY*, January 2016.

78. *Invited* D. Mitlin, Anodes for Sodium Ion Batteries based on Tin - Germanium - Antimony Alloys, *MRS Fall Meeting*, Boston MA, December 2015.

77. *Invited* D. Mitlin, Anodes for Sodium Ion Batteries based on Tin - Germanium - Antimony Alloys, *MRS Fall Meeting*, Boston MA, December 2015.

76. *Invited* D. Mitlin, Thiophene Mitigates High Temperature Fouling of Metal Surfaces in Oil Refining, *Army Research Lab Seminar,* Watervliet NY, November 2015.

75. *Invited* D. Mitlin, Coupling in-situ TEM and ex-situ analysis to understand heterogeneous sodiation of antimony, *Army Research Lab Seminar,* Adelphi MD, November 2015.

74. *Invited* D. Mitlin, Coupling in-situ TEM and ex-situ analysis to understand heterogeneous sodiation of antimony, *2015 CINT Users Meeting,* Santa Fe NM, September 2015.

73. *Invited* D. Mitlin, Thiophene Mitigates High Temperature Fouling of Metal Surfaces in Oil Refining, *BP Seminar Series,* Naperville IL, August 2015.

72. *Invited* D. Mitlin, Design of Electrode Microstructures that Bridge Supercapacitors and Batteries, *Corning Seminar*, Corning NY, May 2015.

71. *Invited* D. Mitlin, Design of Electrode Microstructures that Bridge Supercapacitors and Batteries, *CAMP Annual Technical Meeting*, Canandaigua NY, April 2015.

70. *Invited* D. Mitlin, Design of Electrode Microstructures that Bridge Supercapacitors and Batteries, *BNL Seminar Series*, Upton NY, April 2015.

69. *Invited* D. Mitlin, Si Nanotubes ALD Coated with TiO_2, TiN or Al_2O_3 as High Performance Lithium Ion Battery Anodes, *MRS Spring Meeting 2015,* San Francisco CA, March 2015

68. *Invited* D. Mitlin, High Density Sodium and Lithium Ion Battery Anodes from Banana Peels, *TMS 2015: Annual Meeting & Exhibition,* Orlando FL, March 2015.

67. *Invited* D. Mitlin, Colossal Pseudocapacitance in a High Functionality - High Surface Area Carbon Anode Doubles the Energy of an Asymmetric Supercapacitor, *TMS 2015: Annual Meeting & Exhibition,* Orlando FL, March 2015.

66. *Invited* D. Mitlin, Peanut Shell Hybrid Sodium Ion Capacitor with Extreme Energy - Power Rivals Lithium Ion Capacitors, *249th ACS National Meeting & Exposition,* Denver CO, March 2015.

65. *Invited* D. Mitlin, Peanut Shell Hybrid Sodium Ion Capacitor with Extreme Energy - Power Rivals Lithium Ion Capacitors, *249th ACS National Meeting & Exposition,* Denver CO, March 2015.

64. *Keynote* D. Mitlin, Thiophene Mitigates High Temperature Fouling of Metal Surfaces in Oil Refining, *249th ACS National Meeting & Exposition,* Denver CO, March 2015.

63. *Invited* D. Mitlin, Design of Electrode Microstructures that Bridge Supercapacitors and Batteries, *RIT Seminar Series*, Rochester NY, February 2015.

62. *Invited* D. Mitlin, Design of Electrode Microstructures that Bridge Supercapacitors and Batteries, *NIST Seminar Series*, Gaithersburg MD, February 2015.

61. *Invited* D. Mitlin, Design of Electrode Microstructures that Bridge Supercapacitors and Batteries, *IDTechEx Conference: Supercapacitors USA 2014*, Santa Clara CA, November 2014.

60. *Invited* D. Mitlin, Design of Electrode Microstructures that Bridge Supercapacitors and Batteries, *Binghampton University Seminar Series*, Binghampton NY, October 2014.

59. *Invited* D. Mitlin, Design of Electrode Microstructures that Bridge Supercapacitors and Batteries, *International Symposium on Electrocatalysis ECAT 2014*, Whistler BC, October 2014.

58. *Keynote* D. Mitlin, Design of Electrode Microstructures that Bridge Supercapacitors and Batteries, *64th Canadian Chemical Engineering Conference*, Niagara Falls NY, October 2014.

57. *Invited* D. Mitlin, Design of Electrode Microstructures that Bridge Supercapacitors and Batteries, *Binghampton University Smart Energy Series*, Binghampton NY, October 2014.

56. *Invited* D. Mitlin, Design of Electrode Microstructures that Bridge Supercapacitors and Batteries, *KAUST Seminar*, Jeddah Saudi Arabia, September 2014.

55. *Invited* D. Mitlin, High Density Sodium and Lithium Ion Battery Anodes from Banana Peels, *ORNL Seminar,* Oak Ridge TN, August 2014.

54. *Invited* D. Mitlin, Graphene-nickel cobaltite nanocomposite asymmetrical supercapacitor with commercial level mass loading, *248th ACS National Meeting,* San Francisco CA, August 2014.

53. *Invited* D. Mitlin, Hybrid device employing 3D arrays of MnO in carbon nanosheets bridges battery: Supercapacitor divide, *248th ACS National Meeting,* San Francisco CA, August 2014.

52. *Invited* D. Mitlin, Anodes for sodium ion batteries based on tin - germanium - antimony alloys, *248th ACS National Meeting,* San Francisco CA, August 2014.

51. *Invited* D. Mitlin, Si nanotubes ALD coated with TiO_2, TiN, or Al_2O_3 as high performance lithium ion battery anodes, *248th ACS National Meeting,* San Francisco CA, August 2014.

50. *Keynote* D. Mitlin, Inorganics driven high temperature fouling of metal surfaces in oil refining, *248th ACS National Meeting,* San Francisco CA, August 2014.

49. *Invited* D. Mitlin, Carbon nanosheet frameworks derived from peat moss as high capacity sodium ion battery anodes with superb cycling and rate capability, *97th Canadian Chemistry Conference and Exhibition,* Vancouver BC, June 2014.

48. *Keynote* D. Mitlin, Microstructural Design of Nanoarchitectures for Energy Storage, *Nanostructured Materials for Energy Storage and Conversion Workshop,* Western University, London ON, June 2014.

47. *Invited* D. Mitlin, Interconnected carbon nanosheets derived from hemp for ultrafast supercapacitors with high energy, *247th ACS National Meeting & Exposition,* Dallas TX, April 2013.

46. *Invited* D. Mitlin, Carbon nanosheet frameworks derived from peat moss as high capacity sodium ion battery anodes with superb cycling and rate capability, *247th ACS National Meeting & Exposition,* Dallas TX, April 2013.

45. *Invited* Interconnected Carbon Nanosheets Derived from Hemp for Ultrafast Supercapacitors with High Energy, *TMS Annual Meeting 2014*, San Diego CA, February 2014.

44. *Invited* D. Mitlin, Nanocrystalline Anatase TiO2: a New Anode Material for Rechargeable Sodium Ion Batteries, *TMS Annual Meeting 2014*, San Diego CA, February 2014.

43. *Invited* D. Mitlin, ALD TiO2 Coated Silicon Nanowires for Lithium Ion Battery Anodes with Enhanced Cycling Stability and Coulombic Efficiency, *TMS Annual Meeting 2014*, San Diego CA, February 2014.

42. *Invited* D. Mitlin, Corrosion-fouling of 316 Stainless Steel and Pure Iron by Hot Oil, *TMS Annual Meeting 2014*, San Diego CA, February 2014.

41. *Invited* D. Mitlin, Carbon Nanosheet Frameworks Derived from Peat Moss as High Capacity Intercalation Sodium Ion Battery Anodes, *TMS Annual Meeting 2014*, San Diego CA, February 2014.

40. *Keynote* D. Mitlin, Carbon Nanosheet Frameworks Derived from Peat Moss as High Capacity Sodium Ion Battery Anodes with Superb Cycling and Rate Capability, *Asia Pacific Conference on Electrochemical Energy Storage and Conversion APEnergy2014,* Brisbane, Australia, February 2014.

39. *Invited* D. Mitlin, Carbon Nanosheet Frameworks Derived from Peat Moss as High Capacity Sodium Ion Battery Anodes with Superb Cycling and Rate Capability, *Asia Pacific Conference on Energy and Environmental Materials (APCEEM),* Gold Coast, Australia, February 2014.

38. *Invited* D. Mitlin, Corrosion during Refinery Fouling and in Fuel Cell Electrodes, *GE Oil and Gas Seminar,* Houston TX, December 2013.

37. *Invited* D. Mitlin, Corrosion during Refinery Fouling and in Fuel Cell Electrodes, *Baker Hughes Seminar,* Houston TX, December 2013.

36. *Invited* D. Mitlin, Microstructural Design of Nanoarchitectures for Energy Storage, *Waterloo - Brazil International Exchange Workshop,* Waterloo ON, October 2013.

35. *Invited* D. Mitlin, Microstructural Design of Nanoarchitectures for Energy Storage, *Sandia National Laboratory CINT (Albuquerque) Seminar,* Albuquerque NM, August 2013.

34. *Invited* D. Mitlin, Z. Li, Z. Xu, X. Tan, H. Wang, C. Holt, T. Stephenson, Mesoporous Nitrogen-Rich Carbons Derived from Protein for Ultra- High Capacity Battery Anodes and Supercapacitors, *223rd ECS Meeting,* Toronto ON, May 2013.

33. *Keynote* D. Mitlin, T. Stephenson, M. Derakhshesh, A. Kubis, P. Eaton, B. Newman, A. Hoff, M. Gray, Corrosion-fouling of 316 stainless steel and pure iron by hot oil, *245th ACS National Meeting & Exposition,* New Orleans LA, April 2013.

32. *Invited* D. Mitlin, E.M. Lotfabad, P. Kalisvaart, Silicon nanowire core aluminum shell coaxial nanocomposites for lithium ion battery anodes grown with and without a TiN interlayer., *245th ACS National Meeting & Exposition,* New Orleans LA, April 2013.

31. *Invited* D. Mitlin, X. Tan, L. Wang, C. Holt, B. Zahiri, M. Eikerling, Body centered cubic magnesium niobium hydride with facile room temperature absorption and four weight percent reversible capacity, *245th ACS National Meeting & Exposition,* New Orleans LA, April 2013.

30. *Invited* D. Mitlin, H. Wang, C. Holt, X. Tan, Z. Xu, B. Olsen, T. Stephenson, Graphene-nickel cobaltite nanocomposite asymmetrical supercapacitor with commercial level mass loading, *245th ACS National Meeting & Exposition,* New Orleans LA, April 2013.

29. *Invited* D. Mitlin, Z. Li, X. Tan, Z. Xu, H. Wang, C. Holt, B. Olsen, Carbonized chicken eggshell membrane with a hierarchical 3D architecture as a high energy supercapacitor electrode, *245th ACS National Meeting & Exposition,* New Orleans LA, April 2013.

28. *Invited* D. Mitlin, Z. Li, X. Tan, Z. Xu, H. Wang, C. Holt, B. Olsen, Carbonized chicken eggshell membrane with a hierarchical 3D architecture s a high energy supercapacitor electrode, *245th ACS National Meeting & Exposition,* New Orleans LA, April 2013.

27. *Invited* D. Mitlin, Microstructural Design of Nanoarchitectures for Energy Storage, *UCONN Materials Science and Engineering Seminar Series 2013*, Storrs CT, March 2013.

26. *Invited* D. Mitlin, Z. Li, C. Holt, B. Amirkhiz, X. Tan, Carbonized Chicken Eggshell Membranes with 3D Architectures as High-Performance Electrode Materials for Supercapacitors, *TMS Annual Meeting 2013*, San Antonio TX, March 2013.

25. *Invited* D. Mitlin, H. Wang, C. Holt, Z. Li, Asymmetrical Supercapacitor Based on Graphene-Nickel Cobaltite Nanocomposite and Activated Carbon Electrodes with Commercial Level Mass Loading, *TMS Annual Meeting 2013*, San Antonio TX, March 2013.

24. *Invited* D. Mitlin, E.M. Lotfabad, P. Kalisvaart, A. Kohandehghan, B. Zahiri, C. Holt, Silicon Nanowire Core Aluminum Shell Coaxial Nanocomposites for Lithium Ion Battery Anodes Grown with and without a TiN Interlayer, *TMS Annual Meeting 2013*, San Antonio TX, March 2013.

23. *Invited* D. Mitlin, New Positive and Negative Nanomaterials and Architectures for Supercapacitor Electrodes, *Waterloo Institute for Nanotechnology Seminar Series*, Waterloo ON, December 2012.

22. *Invited* D. Mitlin, Corrosion - Fouling of 316 Stainless Steel and Pure Iron, *BP Seminar Series*, Naperville IL, September, 2012.

21. *Invited* D. Mitlin, Nanostructured Materials for Lithium Ion Batteries and for Supercapacitors, *SET 11th International Conference on Sustainable Energy Technologies*, Vancouver BC, September, 2012.

20. *Invited* D. Mitlin, L. Zhang, L. Wang, K. Malek, T. Navessin, M. H. Eikerling, Highly corrosion resistant platinum-niobium oxide-carbon nanotube electrodes for the oxygen reduction in PEM fuel cells, *63rd Annual Meeting of the International Society of Electrochemistry in Prague Czech Republic*, August 2012.

19. *Keynote* D. Mitlin, High Rate Electrochemical Capacitors from Three Dimensional Arrays of Vanadium Nitride Functionalized Carbon Nanotubes, *ICNFA'12: International Conference on Nanotechnology: Fundamentals and Applications*, Montreal QC, August 2012.

18. *Invited* D. Mitlin, TEM Guided Microstructural Design of Magnesium Hydride Alloys with Capability for Room Temperature Volumetric Absorption Cycling, *World Hydrogen Energy Congress (WHEC) 2012*, Toronto ON, June 2012.

17. *Invited* D. Mitlin, P. Kalisvaart, Hydrogen Storage Materials 2012: Status and Future Prospects, *Canadian Association of Physicists Congress 2012*, Calgary AB, June 2012.

16. *Invited* D. Mitlin, New Positive and Negative Nanomaterials and Architectures for Supercapacitor Electrodes, *McMaster Seminar Series*, Hamilton ON, April 2012.

15. *Invited* D. Mitlin, P. Kalisvaart, M. Danaie, S. Tao, B. Zahiri, H. Fritzsche, TEM Guided Microstructural Design of Magnesium Hydride Alloys with Capability for Room Temperature Volumetric Absorption Cycling, *TMS Annual Meeting 2012*, Orlando FL, March 2012.

14. *Invited* D. Mitlin, P. Kalisvaart, M. Danaie, S. Tao, B. Zahiri, H. Fritzsche, TEM Guided Microstructural Design of Magnesium Hydride Alloys with Capability for Room Temperature

Volumetric Absorption Cycling, *MCARE 2012: Materials Challenges in Alternative and Renewable Energy*, sponsored by American Ceramic Society, Clearwater FL, February 2012.

13. *Invited* D. Mitlin, H. Wang, L. Zhang, Z. Xu, and Z. Li, Supercapacitive Properties of Hydrothermally Synthesized Co_3O_4 Nanostructures, *MCARE 2012: Materials Challenges in Alternative and Renewable Energy*, sponsored by American Ceramic Society, Clearwater FL, February 2012.

12. *Invited* D. Mitlin, P. Kalisvaart, M. Danaie, S. Tao, B. Zahiri, H. Fritzsche, TEM Guided Microstructural Design of Magnesium Hydride Alloys with Capability for Room Temperature Volumetric Absorption Cycling, *NIST Seminar Series*, Gettysburg MD, December 2012.

11. *Invited* D. Mitlin, B.S. Amirkhiz, M.Danaie, B.Simard, Microstructure of Single-walled Carbon Nanotube (SWCNT) Magnesium Hydride (MgH2) Nanocomposites, *COM2010*, Vancouver BC, October 2010.

10. *Invited* D. Mitlin, M. Danaie, B.S. Amirkhiz, C.T. Harrower, Overcoming Kinetic Limitations of Magnesium Hydride, *Hydrogen Storage Materials Workshop at NRC-SIMS*, Ottawa ON, April 2010.

9. *Invited* D. Mitlin, J. Haagsma, C. Ophus, C. T. Harrower, Destabilized Magnesium-based Alloy Thin Films as Model Systems for Hydrogen Storage, *AVS 55th International*, Boston MA, October 2008.

8. *Invited* D. Mitlin, J. Haagsma, C. Ophus, C. T. Harrower, Destabilized Magnesium-Based Alloy Thin Films as Model Systems for Hydrogen Storage, *6th Congress of the International Society for Theoretical Chemical Physics,* Vancouver BC, July 2008.

7. *Invited* H. Fritzsche, M. Saoudi, K. G. Yager, O. M. Tanchak, C. J. Barrett, E. Luber, J. Haagsma and D. Mitlin, Neutron Reflectometry - A Unique Tool to Characterize the Chemical Structure of Thin Films, *The 57th Canadian Chemical Engineering Conference- Nanomaterials Symposia,* Edmonton AB, October 2007.

6. *Invited* V. Radmilovic, Z. Lee, Berkeley, C. Ophus, L.M. Fischer, N. Nelson-Fitzpatrick, K.L. Westra, S. Evoy, U. Dahmen, D. Mitlin, Ultra-hard Nanostructured Al-Mo Thin Films for NEMS Application, *International Conference on Aluminium in conjunction with the 6th World Trade Fair -ALUMINIUM 2006,* Essen Germany, September 2006.

5. *Invited* C. Ophus, D. Mitlin, V. Radmilovic, S. Evoy, L. Fischer, and U. Dahmen, Al-Mo Nanocomposites for MEMS and NEMS Applications, *Lawrence Berkeley National Lab – NCEM Seminar Series,* Berkeley CA, April 2006.

4. *Invited* D. Mitlin, R. Mohammadi, C. Ophus, S. Evoy, K.Westra, L.M. Fischer, V. Radmilovic, Z-H Lee, U. Dahmen, Gas-Sensor Cantilevers Synthesized from Ni-V-Zr Nanocomposites, *ASU-NINT Collaborative Exchange Nanotechnology Forum*, Phoenix AZ, May 2006.

3. *Invited* D. Mitlin, V. Radmilovic, U. Dahmen, Nano-Structured Ultra-Hard Al-Si Films Displaying Elevated Temperature Stability, *Solid-Solid Phase Transformations in Inorganic Materials 2005*, Phoenix AZ, August 2005.

2. *Invited* D. Mitlin, V. Radmilovic, U. Dahmen, Nano-Structured Ultra-Hard Al-Si Films Displaying Elevated Temperature Stability, *TMS Annual Meeting 2005*, San Francisco CA, March 2005.

1. *Invited* D. Mitlin, T.-Y. Pan, M. L. Santella and Z. Feng, The Effect of Spot Friction Welding (SFW) on the Strength and the Microstructure of Aluminum 6111-T4 Lap Joints, *TMS Annual Meeting 2005*, San Francisco CA, March 2005.

Co-Author Principal Investigators, Last 5 Years (reverse chronological order)

E. Paek, Clarkson University

M. Wriedt, Clarkson University

J. Nanda, Oak Ridge National Laboratory

C.B. Carter, University of Connecticut, and CINT Sandia National Laboratory

M.R. Gray: University of Alberta, Chemical and Materials Engineering

A. Hoff: Statoil

B. Newman: Phillips 66

P. Eaton: Athlon Technologies

A.O. Anyia: Alberta Innovates Technology Futures, Bio Solutions (AITF-Bio)

B. S. Amirkhiz: CanmetMATERIALS

L.A. Bendersky: NIST

D.S. Gianola: UPENN

V.R. Radmilovic: LBNL, NCEM

U. Dahmen: LBNL, NCEM

K.J. Hemker: John Hopkins University

P.C. Dastoor: University of Newcastle

M.H. Eikerling: Simon Fraser University

H. Fritzsche: SIMS CNBC, NRC

T. Navessin: IFCI, NCR

G.A. Botton: McMaster University

S.A. McQuarrie: University of Alberta, Faculty of Pharmacy and Pharmaceutical Sciences

A.J.B. McEwan: University of Alberta, Department of Oncology

H. Zhang: University of Alberta, Chemical and Materials Engineering

M.R. Freeman: University of Alberta, Physics

R.A. van Santen: Technical University of Eindhoven

A.P.J. Jansen: Technical University of Eindhoven

R. Steitz: NIST

J. Huot: Universite du Quebec Trois Riviere

S.M. Kuznicki: University of Alberta, Chemical and Materials Engineering

B. Simard: SIMS, NRC

Peer-reviewed Journal Publications

Google Scholar h-index is 44, with > 1500 citations per year

https://scholar.google.com/citations?user=hS5K8A8AAAAJ&hl=en&oi=ao

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134. H. Xie, X. Tan, E. Luber, B. Olsen, P. Kalisvaart, K. Jungjohann, D. Mitlin, J. Buriak, β-SnSb for Sodium Ion Battery Anodes: Phase Transformations Responsible for Enhanced Cycling Stability Revealed by In-situ TEM, under revisions, *ACS Energy Letters*.

133. C. Bommier, D. Mitlin, X. Ji Internal Structure-Na Storage Mechanisms-Electrochemical Performance Relations in Carbons. *Progress in Materials Science*. 2018 DOI: https://doi.org/10.1016/j.pmatsci.2018.04.006.

132. X. Li, K. Zhang, D. Mitlin, Z. Yang, M. Wang, Y. Tang, F. Jiang, Y. Du, J. Zheng Fundamental Insight into Zr-modification of Li-and Mn-Rich (LMR) Cathodes: Combined TEM and EIS Study. *Chemistry of Materials*. 2018, 30(8), 2566-73.

131. J. Ding, H. Zhou, H. Zhang, L. Tong, D. Mitlin, Selenium impregnated monolithic carbons as cathodes for high volumetric energy lithium and sodium metal batteries. *Advanced Energy Materials*, 2018, 1701918.

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127. N. Mao, H.Wang, Y. Sui, Y. Cui, J. Pokrzywinski, J. Shi, W. Liu, S. Chen, X. Wang, and D. Mitlin. Extreme high rate aqueous supercapacitor from doped carbon nanoflakes with huge surface area and mesopores at near commercial mass loading. *Nano Research* 2017, 10(5), 1767-83.

126. J.A. Burgess, C. Holt, E.J. Luber EJ, D.C. Fortin, G. Popowich, B. Zahiri, P. Concepcion, D. Mitlin, M.R. Freeman. Nanoscale Structure, Dynamics, and Aging Behavior of Metallic Glass Thin Films. *Scientific Reports*, 6:30973, DOI: 10.1038/srep30973.

125. J. Ding, Z. Li, K. Cui, S. Boyer, D. Karpuzov, D. Mitlin, Heteroatom enhanced sodium ion capacity and rate capability in a hydrogel derived carbon give record performance in a hybrid ion capacitor. *Nano Energy*, 2016, 23, 129-137.

124. H. Wang, D. Mitlin, J. Ding, Z. Li, K. Cui, Excellent energy–power characteristics from a hybrid sodium ion capacitor based on identical carbon nanosheets in both electrodes. *Journal of Materials Chemistry A*, 2016, 4 (14), 5149-5158.

123. AR Hanifi, B Zahiri, D Mitlin, AL Vincent, TH Etsell, P Sarkar, Effects of washing and calcination–milling on ionic release and surface properties of yttria stabilized zirconia. *Ceramics International,* 2016, 42 (6), 6755-6760.

122. R. Flacau, X. Tan, M. Danaie, H. Fritzsche, D. Mitlin In-situ neutron powder diffraction on TiF3 catalysed magnesium for hydrogen storage applications. *Canadian Metallurgical Quarterly,* 2015 Jan 1;54(1):47-50.

121. H. Fritzsche, S. Bilodeau, R. Flacau, P. Jain, J. Huot. W.P. Kalisvaart, D. Mitlin Interdiffusion of Fe and Mg layers during annealing and deuterium absorption. *Canadian Metallurgical Quarterly,* 2015 Jan 1;54(1):43-6.

120. M. Hazelton, T. Stephenson, J. Lepore, V. Subramani, and D. Mitlin, Sulfide promoted chronic fouling in a refinery: A broad phenomenon spanning a range of heat transfer surfaces and oil types. *Fuel*, 2015, 160, 479-489.

119. Z. Li, X. Tan, P. Li, P. Kalisvaart, M.T. Janish, W.M. Mook, E.J. Luber, K.L. Jungjohann, C.B. Carter and D. Mitlin, Coupling in-situ TEM and ex-situ analysis to understand heterogeneous sodiation of antimony, *Nano Letters*, 2015, 15, 6339-6348.

118. Z. Li, J. Ding, D. Mitlin, Tin and tin compounds for sodium ion battery anodes: phase transformations and performance, *Accounts of Chemical Research*, 2015, 48, 1657-1665.

117. Z. Li, J. Ding, H. Wang, K. Cui, T. Stephenson, D. Karpuzov, David Mitlin, High Rate SnO_2–Graphene Dual Aerogel anodes and their kinetics of lithiation and sodiation, *Nano Energy,* 2015, 15, 369-378.

116. J. Ding, H. Wang, Z. Li, K. Cui, D. Karpuzov, X. Tan, A. Kohandehghan, D. Mitlin, Peanut Shell Hybrid Sodium Ion Capacitor with Extreme Energy - Power Rivals Lithium Ion Capacitors, *Energy and Environmental Science*, 2015, 8, 941-955.

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112. T. Stephenson, M. Hazelton, M. Kupsta, J. Lepore, E. J. Andreassen, A. Hoff, B. Newman, P. Eaton, M. Gray and D. Mitlin, Thiophene mitigates high temperature fouling of metal surfaces in oil refining, *Fuel*, 2015, 139, 411–424.

111. M. R. Afshar, N. Yan, B. Zahiri, D. Mitlin, K. T. Chuang, J. Luo, Impregnation of La0.4Ce0.6O1.8 - La0.4Sr0.6TiO3 as Solid Oxide Fuel Cell Anode in H2S-containing Fuels, *Journal of Power Sources,* 2015, 274, 211-218.

110. X. Tan, L. Wang, B. Zahiri, A. Kohandehghan, D. Karpuzov, E. M. Lotfabad, Z. Li, M. H. Eikerling, and D. Mitlin, Titanium Oxynitride Interlayer to Influence Oxygen Reduction Reaction Activity and Corrosion Stability of Pt and Pt–Ni Alloy, *ChemSusChem*, 2015, 8, 361-376

109. A. Kohandehghan, K. Cui, M. Kupsta, J. Ding, E. M. Lotfabad, W. P. Kalisvaart, and D. Mitlin, Activation with Li Enables Facile Sodium Storage in Germanium, *Nano Letters,* 2014, 14, 5873−5882.

108. E. M. Lotfabad, P. Kalisvaart, A. Kohandehghan, and D. Mitlin, Origin of Non-SEI Related Coulombic Efficiency Loss in Carbons Tested Against Na and Li, *Journal of Materials Chemistry A*, 2014, 2, 19685-19695.

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103. B. Farbod, K. Cui, W.P. Kalisvaart, M. Kupsta, B. Zahiri, A. Kohandehghan, E. Memarzadeh, Z. Li, E.J. Luber, and D. Mitlin, Anodes for Sodium Ion Batteries based on Tin - Germanium - Antimony Alloys, *ACS Nano*, 8, 2014, 4415-4429.

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Cover 98. M. Lotfabad, P. Kalisvaart, A. Kohandehghan, K. Cui, M. Kupsta, B. Farbod and D. Mitlin, Si nanotubes ALD coated with TiO2, TiN or Al2O3 as high performance lithium ion battery anodes, *Journal of Materials Chemistry A*, 2, 2014, 2504-2516.

97. T.J. Stephenson, Z. Li, B.C. Olsen and D. Mitlin, Lithium Ion Battery Applications of Molybdenum Disulfide (MoS2) Nanocomposites, *Energy and Environmental Science,* 7, 2014, 209-231.

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Alberta Funded Proposals (cash, does not include in-kind)

Total of $ 8,013 K (PI's share)

40. High Energy – High Power – High Temperature Supercapacitors, School of Energy and Environment, single applicant, 2013, $ 25K.

39. Cost-Effective Biochar Adsorbents for Naphthenic Acid and Total Organic Carbon Removal for Oilsands Tailings, AITF Bioindustrial Research and Innovation Program, 2012 – 2013, lead applicant, $ 275K (33% share).

38. Energy Materials Characterization and Control (EMC2), CFI 2012 Leading Edge and New Initiatives Funds, 2012, co-applicant, $ 3,986 K total, (12% share).

37. Chronic Corrosion-Fouling and Catastrophic Asphaltene Floculation in Heavy Oil Upgrading, NSERC CRD, single applicant, program renewal with partners (Phillips 66, Statoil, Athlon Technologies), 2013 - 2015, single applicant $ 540 K.

36. NINT NRC Flagship Supercapacitor Program, 2012 - 2013, single applicant, $ 160 K.

35. Automotive Partnership Canada NSERC Strategic Network on Catalysis Research for Polymer Electrolyte Fuel Cell, co-applicant, with partners (Automotive Fuel Cell Corporation and Ballard Power Systems) $ 1000 K, 2013 - 2016, (15% share).

34. Synergistic Surface Mechanical Treatments and Surface Coatings for Enhanced SCW Corrosion Resistance, NSERC CRD with AECL and CANMET, "Gen IV" Program, 2011 – 2014, single applicant, $ 320 K.

33. Multifunctional Carbonized Sludge Based Nanocomposites with Exceptional Flue Gas Pollutant Capture Ability, Proof of Concept (POC) Grant for Game-Changing Ideas, Canada School of Energy and Environment, single applicant, 2012, $ 25 K.

32. Canadian Neutron Beam Laboratory, NSERC MRSIF, 2012, co-applicant, $ 543 K general funding pool, money not subdivided, dollars not included in "PI's share".

31. Large Voltage Window Electrochemical Supercapacitors Derived from Eggshell Membranes, Alberta Bio, Value Chain Sustainability, 2012, single applicant, $ 420 K.

30. Cobalt Oxide – Ionic Liquid Ultracapacitors as Universal Laptop Chargers, AITF nanoBridge, 2011, single applicant, $ 75 K.

29. Hybrid Cobalt Oxide – Graphene Nanoflake Electrodes for Automotive Supercapacitors, NRCan Eco-EII Accelerated Project, 2011, lead applicant, $ 215 K (33% share).

28. Supercapacitors from Biochar and Rust, NINT Internal Collaboration, 2011, lead applicant, $ 150 K (33% share).

27. Downhole Sensors, MSTRI, 24-5D-1A-Downhole-10, single applicant, 2010-2011, $ 77 K.

26. Micro Electric Phase Identification for Horizontal Well Logging, Alberta Ingenuity, nanoBridge, single applicant in partnership with DataCan (https://www.datacan.ca/), 2010 - 2013, $ 990 K.

25. Bimetallic Catalysts Yielding Improved Kinetics in MgH_2 and $Mg(BH_4)_2$ Hydrogen Storage Materials, NRCan, Natural Resources Canada Clean Energy Fund, lead applicant, 2010 - 2012, $ 384 K (33% share).

24. Hybrid CNT-Oxide Supports for Fuel Cells Catalysts, National Research Counsel (NRC), Fuel Cell Technology Development Program (TDP), 2009 - 2011, single applicant, $ 198 K.

23. TEM - guided design of energy storage nanomaterials including electrochemical batteries, electrochemical supercapacitors, and metal hydrides, National Research Counsel (NRC) Operating Grant, 2010 - 2011, $ 250 K.

22. Ultra-sensitive high-pressure differential scanning calorimeter, NSERC RTI, 2010, lead applicant, $ 145 K.

21. Hydrogen Network, NSERC Network Grant, co-applicant, 2009 - 2012, $ 3,000 (4% share) K.

20. Fundamentals of Heavy Oil Fouling, NSERC CRD, lead applicant, with partners (Phillips 66, Statoil, Champion Technologies) 2009 - 2012, $ 480 K, funds not subdivided.

19. TEM-based Approach for Understanding Microstructure-Properties Relations in Hydrogen Storing Mg-Fe-Ti and Mg-Ti-Ni Nanocomposites, NSERC Discovery Grant, single applicant, 2009 - 2014, $ 150 K.

18. Advanced Joining Facilities for Macro, Micro and Nano Level Fabrications (equipment grant), CFI Leading Edge Fund, co-applicant, 2009, $ 1,200 K (20% share).

17. Mg-Al based Thin Film Alloys with Improved Sorption Properties, NRC, NanoInitiative, lead applicant, 2008 - 2011, $ 600 K (50% share).

16. Amorphous-nanocrystalline Hydrogen Storage Materials, NINT NRC, Operating Grant, single applicant, 2007 - 2010, $ 360 K.

15. Hydrogen Testing Sorption System, NRC, Small Capital Equipment Competition, single applicant, 2007, $ 290 K.

14. Petro-Canada Young Innovator Award, Petro-Canada Corporation, single applicant, 2007, $ 20 K.

13. renewal - Multidisciplinary Approach for Improved Welding Processes of Advanced Materials in Automotive Applications, Auto21 Network, co-applicant, 2007 - 2008, total of $ 370 K over two years (17% share).

12. renewal - Chemically Enhanced Formability of Automotive Aluminum Alloys, Auto21 Network, co-applicant, 2007 - 2008, $ 250 K (15% share).

11. Electrocatalytic Hydrogenation of Bitumen Fractions, Centre for Oil Sands Innovation, lead applicant, 2007 - 2009, $ 310 K (50% share).

10. Glove Box and TGA (equipment grant), National Research Counsel (NRC), single applicant, 2006, $ 50 K.

9. Combined Pulsed Laser Deposition – Sputter System for Synthesis of Multiphase Nanostructured Materials and Micro-Devices (equipment grant), Canada Foundation for Innovation, single applicant, 2006, $ 518 K.

8. Combined Pulsed Laser Deposition – Sputter System for Synthesis of Multiphase Nanostructured Materials and Micro-Devices (equipment grant, matching funds), Alberta Innovation and Science, single applicant, 2006, $ 270 K.

7. Site Specific TEM/SEM Specimen Preparation Ion Mill (equipment grant), NSERC Research Equipment Grant, co-applicant, 2006, $ 145 K.

6. Gas Sensor Testing Facility (equipment grant), NSERC Research Equipment Grant, co-applicant, 2006, $ 50 K.

5. Integration of Al-Si Nanostructured Composites into MEMS Manufacturing, Alberta Ingenuity Fund, single applicant, 2006-2007, $ 110 K.

4. Multidisciplinary Approach for Improved Welding Processes of Advanced Materials in Automotive Applications, Auto21 Network, co-applicant, 2007 - 2009, $ 412 K (17% share).

3. Chemically Enhanced Formability of Automotive Aluminum Alloys, Auto21 Network, co-applicant, 2005-2007, $ 275 K (15% share).

2. TEM Sample Cleaner and Image Simulation Facility (equipment grant), NSERC Research Equipment Grant, lead applicant, 2005, $ 136 K + $ 70 K NRC matching.

1. Synthesis of Nanostructured Materials Displaying Ultra-High Hardness, Thermal Stability and Good Ductility, NSERC Discovery Grant, single applicant, 2005 - 2009, $ 168 K.