
NATALIE M. LARSON

Curriculum vitae
Updated: Nov 17, 2018
nmlarson2@gmail.com

EDUCATION

- 01/2016-present **Doctoral Fellow in Residence**
Advanced Light Source (ALS), Lawrence Berkeley National Lab (LBNL)
- 09/2013-present **Ph.D. Materials** *expected 11/2018*
University of California, Santa Barbara (UCSB)
GPA: 4.00/4.00
NSF Graduate Research Fellowship, Advanced Light Source Doctoral Fellowship,
UCSB Chancellor's Fellowship, Holbrook Fellowship
Declined fellowship offers: Stanford Graduate Fellowship, UC Berkeley
Chancellor's Fellowship, UIUC Hamer Graduate Fellowship
- 09/2009-06/2013 **B.S. Materials Science and Engineering (MSE), Mathematics minor,
Nanoscience and Molecular Engineering minor**
University of Washington (UW), Seattle
GPA: 3.99/4.00, Summa Cum Laude, College Honors Program

FELLOWSHIPS AND SCHOLARSHIPS

- 2015-2017 Advanced Light Source Doctoral Fellowship in Residence (LBNL, DOE)
2013-2018 National Science Foundation Graduate Research Fellowship
2013-2018 Chancellor's Fellowship (UCSB)
2013 Institute for Energy Efficiency Holbrook Fellowship (UCSB)
2013 Graduate fellowship offers (declined): Stanford Graduate Fellowship,
Chancellor's Fellowship (UC Berkeley), Hamer Graduate Fellowship (UIUC)
2013 Undergraduate Research Conference Travel Award (UW)
2012-2013 Washington Research Foundation Fellowship (UW)
2012-2013 Patricia G. Lynch and Theodora & Eugene Russell Memorial Scholarship (UW)
2012 James I. Mueller Scholarship Award (UW)
2011 Boeing Scholarship (UW)
2011 Bundy Scholarship (UW)
2010 Materials Science and Engineering Department Scholarship (UW)
2009-2013 Washington NASA Space Grant Consortium Scholarship (UW)
2009-2013 Washington Scholars Scholarship (UW)
2009 Aerojet scholarship (UW)
2009 Lee and Velma Blakeley Memorial Scholarship (UW)
2009 Washington NASA Space Grant Summer Undergraduate Research Award (UW)

HONORS AND AWARDS

2017	Graduate Excellence in Materials Science (GEMS) award – Diamond Ranking (highest), Awarded by the Basic Science Division of The American Ceramic Society at MS&T 2017
2017	First Prize, Neville B. Smith Student Poster Award, Advanced Light Source User Meeting
2013	Presidents Medalist Nominee (Selected among top 5 students at UW)
2013	Deans Medal for Academic Excellence (Top two students in college of engineering at UW)
2013	William E. Quist Award for Outstanding Academic Performance and Potential for Professional Leadership (Top student in MSE at UW)
2013	College of Engineering Community of Innovators Awardee (UW)
2013	1 st Place SAMPE Student Research Symposium Speaking Contest
2013	Outstanding Female Engineer Award (UW Society of Women Engineers)
2013	1 st Place SAMPE student bridge contest
2012	3 rd Place SAMPE Tech Student Poster Contest
2012	2 nd Place SAMPE student bridge contest
2012-2013	Washington NASA Space Grant Consortium Team Award
2012	National SAMPE Student Leader Experience Award
2011	1 st Place SAMPE student bridge contest
2010	CRC Freshman Achievement Award (Top honors chemistry student)

RESEARCH AND WORK EXPERIENCE

01/2016-present	Advanced Light Source (ALS) at Lawrence Berkeley National Lab (LBNL), Berkeley, CA ALS Doctoral Fellow in Residence <i>Beamline 8.3.2: X-ray computed tomography (XCT) (Supervisor: Dula Parkinson)</i>
2013-present	UCSB Materials Department, Santa Barbara, CA NSF Graduate Research Fellow, Chancellors Fellow, Holbrook Fellow <i>In-situ X-ray computed tomography of defect evolution during polymer infiltration and pyrolysis (PIP) processing of ceramic matrix composites (CMCs)</i>
06/2013-08/2013	The Boeing Company: Boeing Research and Technology, Tukwila, WA Intern-Student Engineer in Next Generation Composites
03/2012-06/2014	UW Materials Science and Engineering, Seattle, WA Washington research foundation fellow in Flinn Lab <i>Mechanochromic Fluorescent Probes for Damage Detection in Aerospace Polymers and Composite Parts</i>
06/2012-09/2012	The Boeing Company: Boeing Research and Technology, Auburn, WA Intern-Student Engineer in Production Support for Advanced Developmental Composites (787 Carbon Fiber Composite Fuselage Production Support)

- 06/2011-09/2011 **The Boeing Company: Boeing Research and Technology**, Tukwila, WA
Intern-Student Engineer in Boeing Composite Fuselage Technology Group (787 Carbon Fiber Composite Fuselage Manufacturing Development)
- 06/2010-04/2011 **UW Materials Science and Engineering**, Seattle, WA
Undergraduate researcher In Flinn Lab
Interpenetrating Polymer Network Adhesives
- 06/2009-01/2010 **UW Aeronautics and Astronautics**, Seattle, WA
Washington NASA Space Grant Summer Undergraduate Researcher in Automobili Lamborghini Advanced Composite Structures Lab, led by Prof. Paolo Feraboli

PUBLICATIONS

JOURNAL ARTICLES

4. **Natalie M. Larson**, Charlene Cuellar, Frank W. Zok. "X-ray computed tomography of microstructure evolution during matrix impregnation and curing in unidirectional fiber beds," *Composites Part A*, *in press*.
3. **Natalie M. Larson**, Frank W. Zok. "Insights from *in-situ* x-ray computed tomography during axial impregnation of unidirectional fiber beds," *Composites Part A* **107**, 124-134 (2018).
DOI: 10.1016/j.compositesa.2017.12.024
2. **Natalie M. Larson**, Frank W. Zok. "*In-situ* 3D visualization of composite microstructure during polymer-to-ceramic conversion," *Acta Materialia* **144**, 579-589 (2018).
DOI: 10.1016/j.actamat.2017.10.054
1. Talita Perciano, Daniela Ushizima, Harinarayan Krishnan, Dilworth Parkinson, **Natalie M. Larson**, Daniël M. Pelt, Wes Bethel, Frank Zok and James Sethian, "Insight into 3D micro-CT data: exploring segmentation algorithms through performance metrics," *Journal of Synchrotron Radiation* **24**, 1065 – 1077 (2017).
DOI: 10.1107/S1600577517010955

CONFERENCE PAPERS

6. Harold S. Barnard, D.Y.Parkinson, P.Mandal, A.A.MacDowell, J.C.Peterson, H.Parks, D.M.Pelt, **N.M.Larson**, F.Panerai, and N.N.Mansour. "Synchrotron micro-tomography with in-situ environments at the advanced light source," *3rd International Conference on Tomography of Materials and Structures*, Lund, Sweden, 26-30 June 2017, ICTMS2017-80.
5. Harold S. Barnard, A. A. MacDowell, D. Y. Parkinson, P. Mandal, M. Czabaj, Y. Gao, E. Maillet, B. Blank, **N. M. Larson**, R. O. Ritchie, B. Gludovatz, C. Acevedo, D. Liu. "Synchrotron X-ray micro-tomography at the Advanced Light Source:

Developments in high temperature in-situ mechanical testing," *X-Ray Microscopy Conference 2016 (XRM 2016)*, *Journal of Physics: Conf. Series* **849** 012043 (2017).
DOI: 10.1088/1742-6596/849/1/012043

4. Alastair A. MacDowell, Harold Barnard, Dilworth Y. Parkinson, Abdel Haboub, **Natalie M. Larson**, Frank Zok, Francesco Parerai, Nagi N. Mansour, Hrishikesh Bale, Bernd Gludovatz, Claire Acevedo, Dong Liu, Robert O. Ritchie. "High Temperature X-Ray Micro-Tomography," *AIP Conference Proceedings* **1741**, 050005 (2016).
DOI: 10.1063/1.4952925
3. **Natalie M. Larson**, Ryan E. Toivola, Zhengwei Shi, Sei-Hum Jang, Alex Jen, Gary Georgeson, Brian D. Flinn. "Effect of Matrix Resin Properties on Activity of a Mechanochromic Fluorescent Probe for use in a novel Non-Destructive Inspection Technique for Aerospace Polymer Matrices," *13th International Symposium on Nondestructive Characterization of Materials (NDCM-XIII)*, 20-24 May 2013, Le Mans, France.
2. **Natalie M. Larson**, Ryan E. Toivola, Zhengwei Shi, Sei-Hum Jang, Alex Jen, Gary Georgeson, Brian D. Flinn. "Influence of Matrix Resin Mechanical Properties on Mechanochromic Fluorescent Damage Probe Response," *SAMPE 2013 - Long Beach CA - June 6-9, 2013*. SKU: 58-3361.
1. G. Weber, R. Toivola, **Natalie M. Larson**, B. Flinn. "Morphology-Enhanced Properties of an Interpenetrating Polymer Network Adhesive," *SAMPE 2011 - Long Beach CA - May 23-26, 2011*. SKU: 56-1489.

MAGAZINES

1. **Natalie M. Larson**, "Developing ceramic-matrix composites for more efficient gas turbine engines," *American Ceramic Society Bulletin*, Vol. 95, No. 5 (2016).

ORAL PRESENTATIONS

19. **Natalie M. Larson**, Harold Barnard, Dilworth Parkinson, Alastair MacDowell, Charlene Cuellar, Richard Sim, Frank Zok, "In-Situ Synchrotron X-ray Micro-tomography of Microstructure Evolution during Ceramic Matrix Composite Processing", 3DMS, Helsingor (Elsinore), Denmark, June 11, 2018.
18. *Invited speaker and panelist*: **Natalie M. Larson**, "In-situ X-ray computed tomography of microstructure evolution during processing of composite materials", ImageXD, Berkeley, CA, May 17, 2018.
17. **Natalie M. Larson**, Frank W. Zok, "In-situ XCT of crack evolution during pyrolysis of precursor impregnation and pyrolysis (PIP)-derived ceramic matrix composites (CMCs)," *MS&T 2017*, Pittsburgh, PA, October 11, 2017.

16. **Natalie M. Larson**, Frank W. Zok, "Impregnation of precursors into fiber beds for precursor impregnation and pyrolysis (PIP)-derived ceramic matrix composites (CMCs)," MS&T 2017, Pittsburgh, PA, October 11, 2017.
15. *Invited*: **Natalie M. Larson**, Frank W. Zok, "Characterization of defect evolution in ceramic matrix composite processing via *in-situ* x-ray computed tomography," ALS User Meeting, Berkeley, CA, October 4, 2017.
14. *Invited plenary talk, Student Poster Winner Talk*: **Natalie M. Larson**, Frank W. Zok, "Characterization of defect evolution in ceramic matrix composite processing via *in-situ* x-ray computed tomography," ALS User Meeting, Berkeley, CA, October 3, 2017.
13. **Natalie M. Larson**, Carlos G. Levi, Frank W. Zok, "Shrinkage crack evolution during 1st pyrolysis in polymer impregnation and pyrolysis processing of ceramic matrix composites," MS&T 2016, Salt Lake City, UT, October 26, 2016.
12. *Invited*: **Natalie M. Larson**, Frank W. Zok, "In-situ X-ray Computed Tomography of Defect Evolution in Polymer Impregnation and Pyrolysis Derived Ceramic Matrix Composites," ALS User Meeting, Berkeley, CA, October 5, 2016.
11. **Natalie M. Larson**, Frank W. Zok, "Infiltration Kinetics and Defect Evolution during 1st Infiltration in Polymer Impregnation and Pyrolysis processing of Ceramic Matrix Composites," HTCMC 2016, Toronto, Canada, June 29, 2016.
10. **Natalie M. Larson**, Alastair A. MacDowell, Dilworth Parkinson, Carlos G. Levi, Frank W. Zok, "In-situ high temperature x-ray computed micro-tomography of ceramic matrix composite processing," TMS 2016, Nashville, Tennessee, USA, February 16, 2016.
9. **Natalie M. Larson**, Carlos G. Levi, Frank W. Zok, "In-situ X-ray Computed Micro-tomography of Defect Evolution in Polymer Impregnation and Pyrolysis Derived Ceramic Matrix Composites," ICACC 2016, Daytona Beach, Florida, USA, January 27, 2016.
8. **Natalie M. Larson**, Carlos G. Levi, Frank W. Zok, "In-situ evaluation of defect evolution in polymer impregnation and pyrolysis derived ceramic matrix composites," MS&T 2015, Columbus, Ohio, USA, October 6, 2015.
7. **Natalie M. Larson**, Carlos G. Levi, Frank W. Zok, "In-situ evaluation of defect evolution in polymer impregnation and pyrolysis derived ceramic matrix composites," PACRIM11, Jeju Island, South Korea, September 2, 2015
6. **Natalie M. Larson**, Carlos G. Levi, Frank W. Zok, "Defect evolution during polymer infiltration and pyrolysis processing of ceramic matrix composites," ICACC 2015, Daytona Beach, FL, USA, January 28, 2015

5. **Natalie M. Larson**, Carlos G. Levi, Frank W. Zok, "Defect evolution during polymer infiltration and pyrolysis processing of ceramic matrix composites," MS&T 2014, Pittsburgh, PA, USA, October 15, 2014
4. **Natalie M. Larson**, Ryan E. Toivola, Zhengwei Shi, Sei-Hum Jang, Alex Jen, Gary Georgeson, Brian D. Flinn, "Influence of Matrix Resin Mechanical Properties on Mechanochromic Fluorescent Damage Probe Response," ISNDCM, Le Mans, France, May 20-25, 2013
3. **Natalie M. Larson**, Ryan E. Toivola, Zhengwei Shi, Sei-Hum Jang, Alex Jen, Gary Georgeson, Brian D. Flinn, "Influence of Matrix Resin Mechanical Properties on Mechanochromic Fluorescent Damage Probe Response," SAMPE 2013, Long Beach, CA, May 9, 2013
2. **Natalie M. Larson**, Ryan E. Toivola, Zhengwei Shi, Sei-Hum Jang, Alex Jen, Gary Georgeson, Brian D. Flinn, "Influence of Matrix Resin Mechanical Properties on Mechanochromic Fluorescent Damage Probe Response," SAMPE 2013 Student Research Symposium, Long Beach, CA, May 7, 2013
1. **Natalie M. Larson**, Ryan E. Toivola, Zhengwei Shi, Sei-Hum Jang, Alex Jen, Gary Georgeson, Brian D. Flinn, "Novel Mechanochromic Probe for NDI of Aerospace Polymer Composite Matrices," JEC Europe 2013, Paris, France, March 12, 2013

POSTER PRESENTATIONS

10. "Analysis of *In-situ* Synchrotron X-ray Computed Tomography Images: Microstructure Evolution During Processing of Ceramic Matrix Composite Materials," **Natalie M. Larson**, Charlene Cuellar, Richard Sim, Dilworth Y. Parkinson, Alastair A. MacDowell, Harold S. Barnard, Frank W. Zok, Conference on Data Analysis, Santa Fe, New Mexico, March 7, 2018.
9. "*In-situ* X-ray Computed Tomography of Defect Evolution During Polymer Impregnation and Pyrolysis Processing of Ceramic Matrix Composites," **Natalie M. Larson**, Frank W. Zok, UCSB Winter Study Group on High Performance Materials, Santa Barbara, CA, Jan 9-10, 2018.
8. "In-situ X-ray Computed Tomography of Defect Evolution During Polymer Impregnation and Pyrolysis Processing of Ceramic Matrix Composites," **Natalie M. Larson**, Frank W. Zok, ALS User Meeting, October 2, 2017.
7. "In-situ X-ray Computed Micro-tomography of Defect Evolution in Polymer Impregnation and Pyrolysis Processing of Ceramic Matrix Composites,"

Natalie M. Larson, Frank W. Zok, Basic Energy Sciences Triennial Review, Advanced Light Source, March 21, 2017.

6. "In-situ X-ray Computed Micro-tomography of Defect Evolution in Polymer Impregnation and Pyrolysis Processing of Ceramic Matrix Composites," **Natalie M. Larson**, Carlos G. Levi, Frank W. Zok, ALS User Meeting, October 3, 2016.
5. "In-situ X-ray Computed Micro-tomography of Defect Evolution in Polymer Impregnation and Pyrolysis Processing of Ceramic Matrix Composites," **Natalie M. Larson**, Carlos G. Levi, Frank W. Zok, Gordon Research Conference on Solid State Studies in Ceramics, July 30-Aug 4, 2016.
4. "Matrix Concepts and Processing Protocols for Robust SiC-Based CMCs," **Natalie M. Larson**, Rebecca B. Reitz, Frank W. Zok, Carlos G. Levi, UCSB Winter Study Group on High Temperature Coatings, Jan 7, 2014.
3. "Effect of Matrix Resin Properties on Activity of a Mechanochromic Fluorescent Probe for use in a novel Non-Destructive Inspection Technique for Aerospace Polymer Matrices," **Natalie M. Larson**, Ryan E. Toivola, Zhengwei Shi, Sei-Hum Jang, Alex Jen, Gary Georgeson, Brian D. Flinn, UW Undergraduate Research Symposium. May 17, 2013.
2. "Effect of Epoxy Modulus on Activity of a Fluorescent Probe Molecule for use in a Novel Non-Destructive Inspection Technique for Aerospace Composite Parts," **Natalie M. Larson**, Ryan E. Toivola, Zhengwei Shi, Sei-Hum Jang, Alex Jen, Gary Georgeson, Brian D. Flinn, SAMPE Tech 2012 Student Poster Session
1. "Damage Resistance of Carbon Composites," **Natalie M. Larson**, Paolo Feraboli, UW Undergraduate Research Symposium. May 2010

SEMINARS

8. *Invited*: **Natalie M. Larson***, "X-ray computed tomography of microstructure evolution during polymer impregnation and pyrolysis processing of ceramic matrix composites." Nov 15, 2018, Oak Ridge, TN, Oak Ridge National Laboratory.
7. **Natalie M. Larson***, Frank W. Zok. "In-situ Characterization of Defect Evolution in Polymer Impregnation and Pyrolysis (PIP) Processing of Ceramic Matrix Composites (CMCs)." Jan 12, 2018, Santa Barbara, CA, Structural Seminar, UCSB.

6. *Invited: Natalie M. Larson**, Frank W. Zok, "In-situ Characterization of Defect Evolution in Polymer Impregnation and Pyrolysis (PIP) Processing of Ceramic Matrix Composites (CMCs)." Jan 8, 2018, HRL Laboratories, Malibu, CA.
5. *Invited: Natalie M. Larson**, "In-situ Characterization of Defect Evolution in Polymer Impregnation and Pyrolysis (PIP) Processing of Ceramic Matrix Composites (CMCs)." April 25, 2017, Spark Thermionics, Lawrence Berkeley National Lab.
4. **Natalie M. Larson***, Frank W. Zok. "In-situ Characterization of Defect Evolution in Polymer Impregnation and Pyrolysis (PIP) Processing of Ceramic Matrix Composites (CMCs)." March 10, 2017, Santa Barbara, CA, Structural Seminar, UCSB.
3. **Natalie M. Larson***, Frank W. Zok. "In-situ X-ray Computed Tomography of Defect Evolution in Polymer Impregnation and Pyrolysis Derived Ceramic Matrix Composites." Sept 22, 2016, Berkeley, CA, Experimental Systems Group Staff Meeting, Lawrence Berkeley National Lab.
2. **Natalie M. Larson***, Carlos G. Levi, Frank W. Zok. "In-situ evaluation of defect evolution in polymer impregnation and pyrolysis derived ceramic matrix composites." April 10, 2015, Santa Barbara, CA, Structural Seminar, UCSB.
1. **Natalie M. Larson***, Carlos G. Levi, Frank W. Zok. "Matrix Concepts and Processing Protocols for Robust SiC-Based CMCs." April 4, 2014, Santa Barbara, CA, Structural Seminar, UCSB.

LEADERSHIP, OUTREACH, SERVICE, MENTORING

DIVERSITY, EQUITY, & INCLUSION

- 09/2018-present *Working group member and policy committee co-chair* – TMS PRIDE Working Group in TMS Diversity Committee
- 4/19/2018 *Outreach volunteer* – American Association of University Women Tech Trek. Seventh grade girls meet with scientists at LBNL.
- 3/27/2018 *Outreach volunteer* - ALS Experience with Harding Elementary 5th grade class.
- 02/2018 *Outreach volunteer* – ALS Experience with Oakland Unified School District. Outreach program helped students design and perform experiments on green building materials using beamline 8.3.2.
- 07/2017-present *Councilmember* - Advanced Light Source Diversity and Inclusion council

- 2017-2018 *Co-chair* - 2018 TMS Summit on Diversity in the Minerals, Metals and Materials Professions 3
 Sub-committee leader: Practice on the Professional Level-Students
- 07/2016 *Invited plenary speaker* - "Highlights from "Transforming the Diversity Landscape" Symposium: The Importance of Empathy on the Individual and Program Levels", Diversity in the Minerals, Metals, and Materials Professions 2 (DMMM2), Evanston, IL
- 2015-2016 *Symposium organizer* - TMS 2016 symposium entitled "Transforming the Diversity Landscape"
- 2013-2016 *Member* - UCSB GSDS (Graduate Students for Diversity in Science)
 2014-2016 *Professor contact*, outreach division (leadership committee)
 05/2015 *Host*: Dow Distinguished Lecturer, Dr. Kate Beers (NIST)
- 07/2014 *Participant* - Diversity in the Minerals, Metals, and Materials Professions (DMMM1), Washington, DC, July 29-31, 2014
- 2012 *Participant* - Promoting Equity in Engineering Relationships (PEERS), Seattle, WA, Sept-Dec 2012

MENTORING

- 06/2017-present Mentor, Lawrence Berkeley National Lab (LBNL) Internship
 Intern: Julia Carmen Hestenes
- 06/2016-08/2016 Mentor, Lawrence Berkeley National Lab (LBNL) Cal Energy Corps
 Intern: Richard Sim
- 01/2016-06/2016 Mentor, Lawrence Berkeley National Lab (LBNL) Science Undergraduate Laboratory Internship (SULI)
 Intern: Charlene Cuellar
- 06/2014-08/2014 Mentor, Cooperative International Science and Engineering Internships (CISEI)
 Intern: Jana Staudt

OTHER LEADERSHIP AND SERVICE

- 09/2016-present Reviewer: Composites Part A, Journal of the American Ceramic Society, International Journal of Applied Ceramic Technology, International Journal of Heat and Mass Transfer
- 07/2016 Discussion Leader, Gordon Research Seminar on Solid State Studies in Ceramics - Microstructure Fundamentals and Characterization, July 30-31, 2016

2015-2017 American Ceramic Society's President's Council of Student Advisors – delegate
2016-2017 Engineering Ceramics Divisional Delegate

2011-2013 UW Society for the Advancement of Material and Process Engineering

2012-2013 President

2011-2012 Vice president