

# IAN DANIEL McCUE, PH.D.

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Research and Exploratory Development Department  
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## EDUCATION

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**Ph.D. in Materials Science and Engineering** Sep 2010 – Dec 2015

Johns Hopkins University

Thesis: Frontiers of Dealloying – Novel Processing for Advanced Materials

Advisor: Professor Jonah Erlebacher

**B.S. in Materials Science and Engineering** Sep 2006 – May 2010

Johns Hopkins University

## EMPLOYMENT

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**Assistant Professor** Sep 2021 –

Department of Materials Science and Engineering, Northwestern University

**Adjunct Professor** Jun 2020 – Present

Department of Materials Science and Engineering, Northwestern University

**Senior Research Scientist** Mar 2020 – Present

Research and Exploratory Development Department, JHU Applied Physics Laboratory

**Postdoctoral Research Associate** Sept 2018 – Mar 2020

Research and Exploratory Development Department, JHU Applied Physics Laboratory

**Postdoctoral Research Associate** Jun 2016 – August 2018

Department of Materials Science and Engineering, Texas A&M University

**Graduate Research Assistant and Postdoctoral Research Associate** Sep 2010 – Jul 2016

Department of Materials Science and Engineering, Johns Hopkins University

## AWARDS AND HONORS

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**Invited Speaker, Gordon Research Conference – Physical Metallurgy** 2019

**Materials Research Society Graduate Student Award, Silver** 2014

**Co-Chair, "Gordon Research Seminar on Thin Film and Crystal Growth Mechanisms"** 2013

**Donald S. Rodbell Fellowship**, awarded for academic achievement, Johns Hopkins University 2011 – 2015

**Materials Science and Engineering Senior Research Award**, Johns Hopkins University 2010

**NSF Research Experience for Undergraduates**, Pennsylvania State University 2009

## PUBLICATIONS

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Refereed Journal Publications (total citations: 975, h-index: 12)

- (20) **I. McCue**, S. Xiang, K. Xie, M.J. Demkowicz, “The effect of microstructure morphology on indentation response of Ta/Ti nanocomposites,” *Metallurgical Transactions A*, (**2020**)
- (19) S. Xiang, **I. McCue**, D. Yadav, Y. Wang, J.K. Baldwin, M. Demkowicz, K. Xie “Comparative study of He bubbles in a Ti-Ta alloy and a TiTa nanocomposite,” *Philosophical Magazine Letters*, (**2020**)
- (18) **I. McCue**, C. Peitsch, T. Montalbano, A. Lennon, J. Sopcisak, M. Trexler, S. Storck, “Scalable Laser Powder Bed Fusion Processing of NiTi Shape Memory Alloy,” *MRS Communications*, **9** (4), 1214-1220 (**2019**)
- (17) Y. Zeng, B. Gaskey, E. Benn, **I. McCue**, G. Greenidge, K. Livi, X. Zhang, J. Jiang, J. Elebacher, “Electrochemical Dealloying with Simultaneous Phase Separation,” *Acta Materialia*, **171**, 8-17 (**2019**)
- (16) B. Gaskey, **I. McCue**, A. Chuang, J. Erlebacher, “Self-Assembled Porous Metal-Intermetallic Nanocomposites via Liquid Metal Dealloying,” *Acta Materialia*, **164**, 293-300 (**2019**)
- (15) **I. McCue**, J. Stuckner, M. Murayama, M.J. Demkowicz, “Gaining new insights into nanoporous gold by mining and analysis of published images,” *Scientific Reports*, **8**, 6761 (**2018**)  
\*Paper featured on National Science Foundation homepage for impact on Materials Genome Initiative
- (14) **I. McCue**, A. Karma, J. Erlebacher, “Pattern Formation During Electrochemical and Liquid Metal Dealloying,” *MRS Bulletin*, 43 (1), (**2018**)
- (13) **I. McCue**, MJ Demkowicz, “Alloy design criteria for solid metal dealloying of thin films,” *JOM*, 69 (11), 1-7 (**2017**)
- (12) J. Stuckner, K. Frei, **I. McCue**, M.J. Demkowicz, M. Murayama, “AQUAMI: An open source Python package and GUI for the automatic quantitative analysis of morphologically complex multiphase materials,” *Computational Materials Science*, 139, 320-329 (**2017**)
- (11) **I. McCue**, B. Gaskey, B. Crawford, J. Erlebacher, “Local heterogeneity in the mechanical properties of bicontinuous composites made by liquid metal dealloying,” *Applied Physics Letters*, 109 (23), 231901 (**2016**)
- (10) **I. McCue**, B. Gaskey, P.-A. Geslin, A. Karma, J. Erlebacher, “Kinetics and morphological evolution of liquid metal dealloying,” *Acta Materialia*, 115, 10-23 (**2016**)
- (9) M. Seita, M. Volpi, S. Patala, **I. McCue**, C.A. Schuh, M.V. Diamanti, J. Erlebacher, M.J. Demkowicz, “A high-throughput technique for determining grain boundary character non-destructively,” *npj Computational Materials*, 2, 16016 (**2016**)
- (8) **I. McCue**, E. Benn, B. Gaskey, J. Erlebacher, “Dealloying and dealloyed materials,” *Annual Reviews of Materials Research*, 46 (1), 1.1–1.24 (**2016**)
- (7) **I. McCue**, S. Ryan, K. Hemker, X. Xu, N. Li, M. Chen, J. Erlebacher, “Size effects in the mechanical properties of bulk bicontinuous Ta/Cu nanocomposites made by liquid metal dealloying,” *Advanced Engineering Materials*, 18 (1), 46-50 (**2016**)  
\*Paper nominated and selected to be featured on Wiley’s monthly news portal Materials Views
- (6) P.-A. Geslin, **I. McCue**, B. Gaskey, A. Karma, J. Erlebacher, “Topology-generating interfacial pattern formation during liquid metal dealloying,” *Nature Communications*, 6:8887 (**2015**)

- (5) X. Li, Q. Chen, **I. McCue**, J. Snyder, P. Crozier, J. Erlebacher, K. Sieradzki, "Dealloying of noble-metal alloy nanoparticles," *Nano Letters*, 14 (5), 2569-2577 (**2014**)
- (4) J. Erlebacher, **I. McCue**, "Geometric characterization of nanoporous metals," *Acta Materialia*, 60 (17), 6164-6174 (**2012**)
- (3) **I. McCue**, J. Snyder, X. Li, Q. Chen, K. Sieradzki, J. Erlebacher, "Apparent inverse Gibbs Thomson effect in dealloyed nanoporous nanoparticles," *Physical Review Letters*, 108 (22), 225503 (**2012**)
- (2) J. Snyder, **I. McCue**, K. Livi, J. Erlebacher, "Structure/Processing/Properties relationships in nanoporous nanoparticles as applied to catalysis of the cathodic oxygen reduction reaction," *Journal of the American Chemical Society*, 134 (20), 8633-8645 (**2012**)
- (1) J. Sun, O. Wilson, M. Reese, B.J. Jung, T. Dawidcyk, M. Yeh, B.M. Dhar, B.N. Pal, P. Trottman, **I. McCue**, L. Berger, G.R. Blum, E. Heinemann, D. McGee, J.D. Erlebacher, H.E. Katz, "Hands-on preparation and testing of solution-processed semiconductor devices in the undergraduate classroom," *Journal of Materials Education*, 31 (5), 271-284 (**2009**)

## PRESENTATIONS

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### Selected Department Seminars

University of Washington, Department of Materials Science and Engineering,	April ( <b>2018</b> )
Stanford University, Department of Materials Science and Engineering,	March ( <b>2018</b> )
University of Pennsylvania, Department of Materials Science and Engineering,	March ( <b>2018</b> )
UCLA, Department of Materials Science and Engineering,	April ( <b>2017</b> )
NC State University, Department of Materials Science and Engineering,	September ( <b>2016</b> )

### Selected Conference Oral Presentations (total number of oral presentations: 19)

“\*\*” denotes an invited presentation. Presenting authors are underlined.

\***I. McCue**, “Processing Insights from Data Science: Teaching Old Materials New Tricks,” *Physical Metallurgy Gordon Research Conference*, Biddeford, ME, July (**2019**)

\***I. McCue**, “Averting Plastic Flow Localization in Metal Nanocomposites by Tailoring Microstructure Morphology,” *Materials Research Society Spring Meeting*, Phoenix, AZ, April (**2018**)

**I. McCue**, M. Demkowicz, “Averting Plastic Flow Localization in Metal Nanocomposites by Tailoring Microstructure Morphology,” *TMS*, Phoenix, AZ, March (**2018**)

\***Gold Presentation Award**, Ultrafine-grained Materials X

**I. McCue**, B. Gaskey, P.-A. Geslin, A. Karma, J. Erlebacher, “Kinetics of Morphological Evolution during Liquid Metal Dealloying” *Materials Research Society Fall Meeting*, Boston, MA, December (**2015**)

**I. McCue**, S. Ryan, K. Hemker, X. Xu, N. Li, M. Chen, J. Erlebacher, "Hierarchical, Bicontinuous Refractory-Based Nanocomposites," *Materials Research Society Fall Meeting*, **Graduate Student Award Talk**, Boston, MA, December (**2014**)

**I. McCue**, S. Ryan, K. Hemker, X. Xu, N. Li, M. Chen, J. Erlebacher, "Mechanical Properties of Hierarchical Refractory-Based Nanocomposites," *First International Symposium on Nanoporous Materials by Alloy Corrosion*, Lake Bostol, Germany, September (**2014**)

\***I. McCue**, J. Erlebacher, "Dealloying and Fabrication of Porous Tantalum," *Gordon Research Conference in Thin Film and Crystal Growth*, Biddeford, ME, July (**2013**)

\*Abstract was selected to give oral presentation

**I. McCue**, J. Snyder, X. Li, Q. Chen, K. Sieradzki, and J. Erlebacher, "Apparent Inverse Gibbs-Thomson Effect in Dealloyed Nanoporous Nanoparticles," *Materials Research Society Fall Meeting*, Boston, MA, November (**2012**)

## PATENT FILINGS

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- (4) S. Stock, S. Rengaswamy, M. Brupbacher, **I. McCue**, "Reactive Additive Manufacturing of Metallic Matrix Composites with Ceramics," U.S. Patent Application No. 17/012,228, filed September (**2020**)
- (3) S. Storck, M. Trexler, A. Lennon, S. Nimer, C. Peitsch, **I. McCue**, "Localized Tailoring of Three-Dimensional Articles Via Additive Manufacturing," U.S. Patent Application Serial No. 16/937,897, filed July (**2020**)
- (2) J. Erlebacher, **I. McCue**, B. Gaskey, M. Brupbacher, "Nanostructured Thermal Spray Coatings," U.S. Provisional Patent Application No. 6245213, filed November (**2016**)
- (1) J. Erlebacher, **I. McCue**, "Nanostructured Composite Materials Containing Refractory Elements," U.S. Patent Application Serial No. 13/975,659 filed August (**2013**)

## PROFESSIONAL ACTIVITIES

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Reviewer For: Acta Materialia, Corrosion Science, JOM, Materials, Materials Research Letters, Metals, Modeling and Simulations in MSE, Nature Communications, RCS Advances, Scientific Reports

## TEACHING AND MENTORING EXPERIENCE

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### Undergraduate Senior Design Mentor, Johns Hopkins University

Thomas Swift, "Dealloying and Fabrication of Ta and Nb Capacitors"  
Anita Luong, "Synthesis of Nanoporous Tantalum"

Sep 2014 – May 2015  
Sep 2011 – May 2012

### Teaching Assistant, Johns Hopkins University

Phase Transformations, Thermodynamics of Materials,  
Mechanical Properties of Materials, MSE Laboratory

Fall 2009 – Spring 2012

### NCAA Division III Assistant Fencing Coach, Johns Hopkins University

Sep 2010 – Mar 2016

Responsibilities: designed and oversaw conditioning and skill exercises; gave individual private lessons;  
traveled with the team and coached at competitions

Contact: Austin Young, Head Coach, email: [coachy@jhu.edu](mailto:coachy@jhu.edu)