

# Boris Lau, Ph.D.

---

Assistant Professor  
University of Massachusetts Amherst  
Department of Civil & Environmental Engineering  
E-mail: borislau@umass.edu  
<https://blogs.umass.edu/borislau>

18B Marston Hall  
130 Natural Resources Road  
Amherst, MA 01003-9293  
Phone: (413) 545-5423  
Fax: (413) 545-2840

## Professional Preparation

|                                  |                                     |       |                 |
|----------------------------------|-------------------------------------|-------|-----------------|
| McGill University                | Environmental Science and Biology   | B.S.  | 06/2000         |
| University of Wisconsin, Madison | Environmental Engineering           | M.S.  | 12/2002         |
| University of Wisconsin, Madison | Environmental Engineering           | Ph.D. | 12/2005         |
| Northwestern University          | Environmental Engineering, Post-Doc |       | 01/2006-08/2007 |
| Duke University                  | Environmental Engineering, Post-Doc |       | 09/2007-12/2008 |

## Appointments

|   |             |
|---|-------------|
| Assistant Professor, Civil & Environmental Engineering, UMass Amherst | 2014 –      |
| Adjunct Faculty, Chemical Engineering, UMass Amherst                  | 2015 –      |
| Adjunct Faculty, Geosciences, UMass Amherst                           | 2015 –      |
| Assistant Professor, Geology, Baylor University                       | 2009 – 2013 |

## Selected Honors & Awards

NSF CAREER Award, 2015  
Marie Curie Fellowship, European Commission, 2011  
National Water Research Institute Fellowship, Fountain Valley, California, 2004

## Selected Recent Publications (From 30 peer-reviewed articles and 2 book chapters)

(name denotes advisee supervised by Lau)

1. Zhu T., Lawler D.F., Chen Y., **Lau B.L.T.** 2016. Effects of natural organic matter and sulfidation on the flocculation and filtration of silver nanoparticles. *Environ. Sci.: Nano.* 3, 1436-1446.
2. Ikuma K., Shi Z., Walker A.V., **Lau B.L.T.** 2016. Effects of protein species and surface physicochemical features on the deposition of nanoparticles onto protein-coated planar surfaces. *RSC Advances.* 6, 75491–75498.
3. Huang R. and **Lau B.L.T.** 2016. Biomolecule-nanoparticle interactions: Elucidation of the thermodynamics by isothermal titration calorimetry. *Biochim. Biophys. Acta – Gen Subjects,* 1860, 5, 945-956.
4. Huang R., Carney R.P., Ikuma K., Stellacci F., and **Lau B.L.T.** 2014. Effects of Surface Compositional and Structural Heterogeneity on Nanoparticle-Protein Interactions: Different Protein Configurations. *ACS Nano,* 8 (6), 5402–5412.
5. Ikuma K., Madden A.S., Decho A.W., **Lau B.L.T.** 2014. Deposition of nanoparticles onto polysaccharide coated surfaces: implications for nanoparticle–biofilm interactions. *Environ. Sci.: Nano,* 1, 117-122.
6. Huang R., Carney R.P., Stellacci F., and **Lau B.L.T.** 2013. Protein-Nanoparticle Interactions: the effects of surface compositional and structural heterogeneity is scale dependent. *Nanoscale.* 5 (15), 6928-6935.
7. Furman, O., Usenko S., **Lau B.L.T.** 2013. Relative importance of the humic and fulvic fractions of natural organic matter in the aggregation and adsorption of silver nanoparticles. *Environ. Sci. Technol.* 47 (3), 1349-1356.
8. Huang R., Carney R.P., Stellacci F., and **Lau B.L.T.** 2013. Colloidal Stability of Self-assembled Monolayer Coated Gold Nanoparticles: the Effects of Surface Compositional and Structural Heterogeneity. *Langmuir.* 29 (37), 11560–11566.

9. Ruggeri F.\*, Zhang F.\*, Lind T., Bruce E.D., **Lau B.L.T.**, and Cardenas M. 2013. Non-specific interactions between soluble proteins and lipids induce irreversible changes in the properties of lipid bilayers. *Soft Matter*. 9 (16), 4219 – 4226.
10. **Lau B. L. T.**, Hockaday W.C., Ikuma K., Furman O., and Decho A.W. 2013. A Preliminary assessment of the interactions between the capping agents of silver nanoparticles and environmental organics. *Colloid Surface A*. 435, 22-27.

### **Selected Synergistic Activities**

#### **1. Invited lectures:**

- Surface Chemistry at the Nano-Bio Interface. University of Vermont, 2017.
  - Importance of Surface Heterogeneity in Nanoparticle-Organics Interactions. University of Connecticut, 2015.
  - Nanoparticle-Biofilm Interactions at the Solid-Water Interface. University of Western Ontario, Canada, 2014.
  - To stick or not to stick? That's the question for understanding the mobilization of metal nanoparticles. University of Vienna, Austria, 2013.
  - Adsorption of metal-based nanoparticles: the importance of surface modification from simple to complex organics. Keynote lecture for the International Conference on Interfaces Against Pollution, Nancy, France. 2012

#### **2. Scientific Program Committees:**

- Organizer of conference sessions: “Environmental Nanometrology” at the 256th ACS National Meeting, Boston, MA, 2018; “Environmental Transformation of Nanoparticles: Processes, Mechanisms, and Ecological Impacts” at the 250th ACS National Meeting, Boston, MA, 2015 • Chair, Particulate Contaminants Research Committee, American Water Works Association (AWWA), 2008 – 2011

#### **3. Editorship and Review activities:**

- Editorial Board Member, Scientific Report, 2017 – Present; Associate Editor, *RSC Advances*, 2015 – 2017; Guest editing for: *Nanotechnology*, focus collection on the life cycle of nanomaterials, 2015-16; *Frontiers in Microbiology*, special issue for the microbiological chemistry section on Nanoparticle-Biofilm Interactions, 2014-15
- Proposal review for: Natural Sciences and Engineering Research Council (NSERC) of Canada – Discovery Grant, 2017; American Association for the Advancement of Science (AAAS) – Research Competitiveness Program, 2015 & 2018; National Science Foundation – Environmental Health and Safety of Nanotechnology Program, 2015; Hydrologic Sciences Program, 2015; Environmental Engineering Program, 2012 & 2014; Graduate Research Fellowships Program, 2017
- Invited manuscript review for: *ACS Cent. Sci.*, *ACS Appl. Mater. Interfaces*, *ACS Nano*, *Angew. Chem.*, *Chem Commun.*, *Chemosphere*, *Colloid Surface A*, *Environ. Pollut.*, *Environ. Sci.: Nano*, *Environ. Sci.: Processes Impacts*, *Environ. Sci. Technol.*, *Environ. Sci. Technol. Letters*, *Green Chem. Lett. Rev.*, *J. Agric. Food Chem.*, *J. AWWA*, *J. Environ. Eng.-ASCE*, *J. Environ. Monitor.*, *J Hazard Mater.*, *Langmuir*, *Nanoscale*, *Nanotechnology*, *Part. Part. Syst. Char.*, *PLOS One*, *R. Soc. Chem. Adv.*, *Sci. Rep.*, *Sci. Total Environ.*, *Small*, *Water Res.*, *Water Sci. Technol.*

### **Graduate Advisors and Postdoctoral Sponsors**

Graduate: Gregory W. Harrington and Marc A. Anderson (UW-Madison)

Postdoc: Aaron I. Packman (Northwestern) and Helen Hsu-Kim (Duke)

### **Advising (Graduate Students and Postdocs)**

**Postdoc:** Olha Furman (co-advised with S. Usenko), Kaoru Ikuma **PhD:** Rixiang Huang, Fall 2009 – Fall 2013; Fan Zhang, Spring 2011 – Fall 2013 (co-advised with E. Bruce), Michael Nguyen, Summer 2012 – Present (co-advising with W. Hockaday), Zehui Xia, Fall 2014 – Present; Joann Rodriguez, Fall 2015 – Present (co-advising with C. Butler); Salimar Cordero, Fall 2017 – Present (co-advising with C. Butler) **MS:** Yunqi Chen, Summer 2014 – Spring 2015, Joseph Murphy, Summer 2015 – Spring 2017