ADINA CHUANG HOWE, Ph.D.

EDUCATION

2005 – 2009	University of Iowa, Iowa City, IA Ph.D., Dept. of Environmental Engineering and Science Advisor: Timothy Mattes Doctoral dissertation: *Proteomic investigations of vinyl chloride-assimilating bacteria: from pure cultures to the environment*
2003 – 2005	Purdue University, West Lafayette, IN M.S., Dept. of Civil and Environmental Engineering Advisors: Larry Nies and Suresh Rao Thesis: *Life cycle analysis of impacts of new construction*
1999 – 2003	Purdue University, West Lafayette, IN B.S., Dept. of Mechanical Engineering

RESEARCH EXPERIENCE

January, 2015	GERMS Laboratory, Iowa State University, Ames, IA Assistant Professor, Agricultural and Biosystems Engineering
2013 – present	Argonne National Laboratory, Argonne, IL Assistant Computational Biologist, Computing and Life Sciences Project: *Metagenomic analysis of soil and human gut microbial communities*
2012 – present	Michigan State University, East Lansing, MI Adjunct Faculty, Dept. of Microbiology and Microbial Genetics
2012 – 2013	Argonne National Laboratory, Argonne, IL Post-doctoral Researcher, Computing and Life Sciences
2009 – 2012	Michigan State University, East Lansing, MI Post-doctoral Fellow, Dept. of Microbiology and Microbial Genetics Advisors: C. Titus Brown and James Tiedje Project: *Metagenomic investigations of soil microbial systems*
2007	Chinese Academy of Sciences, Beijing, China Research Center for Eco-Environmental Sciences Supervisor: Guibin Jiang Project: *Development of vitellogenin protein biomarkers for endrocrine disrupting chemicals in zebrafish*

ON-GOING RESEARCH PROJECTS

1. khmer: k-mer counting and filtering. Software project, at http://github.com/ged-lab/khmer/. Michael R. Crusoe, Greg Edvenson, Jordan Fish, **Adina Howe**, Eric McDonald, Joshua Nahum, Kaben Nanlohy, Jason Pell, Jared Simpson, C. S. Welcher, Qingpeng Zhang, and C. Titus Brown. BSD license. Estimated 200 users; 32 GitHub stars (93-99%ile); 56 GitHub forks (97-100%ile).

2. Comparison of microbial communities in soil aggregates of various bioenergy crops. Collaborators: Kirsten Hofmockel, Iowa State University.

3. Microbial and viral drivers of obesity and gut diseases. Collaborator: Eugene Chang, University of Chicago.

4. Identification of dark matter proteins in metagenomes in Argonne National Laboratory's MG-RAST public database.

5. Microbial community effects on elemental cycling in natural and managed soil systems. Collaborators: James Tiedje and C. Titus Brown, Michigan State University; Janet Jansson and Susannah Tringe, Joint Genome Institute.

6. Identification of rhizosphere microbial communities in bioenergy crop soils. Collaborators: James Tiedje, Aaron Garoutte, and Jiarong Guo, Michigan State University.

7. Elucidating the pathways involved in bacterial butyrate production. Collaborators: James Tiedje and Marius Vital, Michigan State University.

8. Identification of pathogenic viral biomarkers in wastewater streams. Collaborators: Joan Rose and Tiong Gaw Am, Michigan State University.

PUBLICATIONS

1. Williams, R.J., **Howe, A.**, and Hofmockel, K. 2014. Demonstrating microbial co-occurrence patter analyses within and between ecosystems. Frontiers in Microbiology 5(358). doi: 10.3389/fmicb.2014.00358 http://journal.frontiersin.org/Journal/10.3389/fmicb.2014.00358

2. Zhang, Q.P., Pell, J., Canino-Koning, R., **Howe**, **A.C.**, and Brown, C. T. 2014. These are not the k-mers you are looking for: Efficient online k-mer counting using a probabilistic data structure. PLoS ONE 9(7): e1011271. doi: 10.1371/journal.pone.0101271. http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0101271

3. **Howe, A.C.**, Jansson, J., Malfattie, S., Tringe, S., Tiedje, J., and Brown, C.T. 2014. Tackling soil diversity with the assembly of large, complex metagenomes. PNAS. Accepted February 11, 2014. doi:10.1073/pnas.1402565111. http://www.pnas.org/content/early/2014/03/13/1402564111.short

4. Vital, M, **Howe, A.C.**, and Tiedje, J. 2014. Revealing the bacterial butyrate-synthesis pathways from (meta)genomic data. mBio 5(2):e00889-14. doi: 10.1128/mBio. 00889-14. *Featured in Faculty of 1000 Prime.* http://mbio.asm.org/content/5/2/e00889-14

5. Schwarz, E., Korhonen, P., Campbell, B., Young, N., Jex, Aaron, Jabbar, A., Hall, R. Mondal, A., **Howe, A.C.**, Pell, J. Hofmann, A., Boag, P., Zhu, X., Gregory, T., Loukas, A., Williams, B., Antoshechkin, I., Brown, C.T., Sternberg, P., and Gasser, R. 2013. The genome and developmental transcriptome of the strongylid nematode *Haemonchus contortus*. Genome Biology 14(R89). doi:10.1186/gb-2013-14-8-r89. http://genomebiology.com/2013/14/8/R89

6. Pell, J., Hintze, A., Canino-Koning, R., **Howe, A.C.,** Tiedje, J.M., and Brown, C.T. 2012. Scaling metagenome sequence assembly with probabilistic de Bruijn graphs. PNAS 109(33):13272-13277. doi:10.1073/pnas.1121464109. http://www.pnas.org/content/109/33/13272.full

7. **Chuang, A.S.**, Jin, Y.O., Schmidt, L.S., Li, Y., and Mattes, T.E. 2010. Proteomic analysis of ethene-enriched groundwater microcosms from a vinyl chloride-contaminated site. Environ. Sci. Technol. 44(5):1594-1601. doi: 10.1021/es903033r. http://pubs.acs.org/doi/abs/10.1021/es903033r

8. **Chuang, A.S.** and Mattes, T.E. 2007. Identification of polypeptides expressed in response to vinyl chloride, ethene, and epoxyethane in *Nocardioides* sp. strain JS614 by using peptide mass fingerprinting. Appl. Env. Microbiol. 73(13):4368-4372. doi: 10.1128/AEM.00086-07. http://aem.asm.org/content/73/13/4368.full

9. Mattes, T.E., Coleman, N.V., **Chuang, A.S.**, Rogers, A., Spain, J.C., and Gossett, J.M. 2006. Mechanism controlling the extended lag period associated with vinyl chloride starvation in *Nocardioides* sp. strain JS614. Arch. of Microbiol. 187(3):217-226. http://link.springer.com/article/10.1007%2Fs00203-006-0189-2

CURRENT GRANTS AWARDED

1. PIs: Hofmockel, K.H., Howe, A.C., Meyer, F.M., and Orr, G. Microbial drivers of global change at the aggregate scale: linking genomic function to carbon metabolism and warming. Department of Energy. September, 2013. $2,944,265 USD.

2. PIs: Hofmockel, K.H. and Howe, A.C. Development of novel approaches to target microbial drivers of C cycling in soil aggregates. Joint Genome Institute. October, 2013.

3. PIs: Howe, A.C. and Ringus, Daina. Going viral: The Role of the Phageome in Human Ulcerative Colitis. University of Chicago Digestive Diseases Research Core Center Pilot and Feasibility Grant. October, 2013. $20,000 USD.

PAST GRANTS AWARDED

1. PI: Howe, A.C. Metagenomic investigations of rhizosphere microbial communities in bioenergy crop soils. National Science Foundation Postdoctoral Fellowship in Biology. 2009. Amount awarded: 123,000 USD.

2. PI: Howe, A.C. Development of bioinformatics tools for soil metagenomic sequencing. Michigan State University Office of the Provost. 2009. Amount awarded: 92,500 USD.

3. PI: Chuang, A.S. Identification of protein biomarkers in response to vitellogenin in local fish. National Science Foundation East Asia Pacific Studies Internship. 2007. Amount awarded: 10,000 USD.

4. PI: Chuang, A.S. Metaproteomic investigations for vinyl-chloride biomarkers in the environment. National Science Foundation Graduate Research Fellowship. 2006. Amount awarded: 100,000 USD.

5. PI: Chuang, A. University of Iowa Presidential Research Fellowship. 2005. Amount awarded: 100,000 USD. (*Awarded but declined due to alternative funding source.*)

SELECT ORAL PRESENTATIONS

1. Assembly of complex metagenomes. May, 2013. **Howe, A.C.** American Society of Microbiology. (invited presentation)

2. Dirty little secrets for soil metagenomic assembly. August, 2012. **Howe, A.C.** International Society of Microbial Ecology. (invited presentation)

3. The dirt on soil metagenomics assembly. May, 2012. **Howe, A.C.** SciLifeLab, Stockholm, Sweden. (invited presentation)

4. Approaches for scaling de novo assembly of metagenomic sequencing. March, 2012. **Howe, A.C.** X-Gen Conference and Expo, San Diego, CA. (invited presentation)

5. Deep sequencing of soil microbial communities of bioenergy crops. October, 2011. **Howe, A.C.**, Garoutte, A., Guo., J., and Tiedje, J.M. 3rd Annual Argonne Soils Workshop, Argonne National Laboratories, Argonne, IL. (invited presentation)

6. Exploring soil diversity with next generation sequencing. October, 2011. **Howe, A.C.,** Brown, C., and Tiedje, J.M. Frontiers of Soil Science Seminar Series, University of Wisconsin, Department of Soil Science, Madison, WI. (invited presentation)

7. Breaking down big data with assembly of soil metagenomes. June, 2011. **Howe, A.C.**, Pell, J., Canino-Koning, R., Hintze, A., and Brown, C.T. Earth Microbiome Project General Meting, Shenzhen, China. (invited presentation)

8. Breaking down big data in soil metagenomes. May, 2011. **Howe, A.C.**, Pell, J., Canino- Koning, R., Hintze, A., and Brown, C.T. 111th General Meeting of American Society of Microbiology, New Orleans, LA. (invited presentation)

TEACHING EXPERIENCE

Instructor, Kellogg Biological Station, Hickory Corners, MI. Next generation sequencing course, 2014.

Instructor, University of Iowa, Iowa City, IA. Software carpentry workshop, 2013.

Instructor, Kellogg Biological Station, Hickory Corners, MI. Next generation sequencing course, 2013.

Instructor, Women in Science and Engineering, Boston, MA. Software carpentry workshop, 2013.

Teaching Assistant, Kellogg Biological Station, Hickory Corners, MI. Next generation sequencing course, 2012.

Instructor, University of British Columbia, Vancouver, Canada. Software carpentry workshop, 2012.

Teaching Assistant, Michigan State University, East Lansing, MI. Software carpentry workshop, 2012.

Instructor, Michigan State University, East Lansing, MI. Metagenomic de novo assembly workshop, 2011.

Instructor, Yonsei University, Seoul, Korea. Metagenomic sequencing and assembly workshop, 2010.

Instructor, Michigan State University, East Lansing, MI. Assembly of next generation sequencing short reads, 2010.

Instructor, University of Iowa, Iowa City, Iowa. Environmental Chemistry Laboratory, 2008.

Instructor, Purdue University, West Lafayette, Indiana. Microbiology Laboratory, 2004.

ADVISING EXPERIENCE

Student:	Aaron Garoutte, 2010 – present. Michigan State University. Graduate student, mentor.
Dissertation:	Metatranscriptomic investigations of plant-microbe interactions in bioenergy crop soils
Student:	Julian Yu, 2010 – 2012. Michigan State University. Undergraduate student, formal advisor.
Project:	Plant-microbe interactions in isolates from bioenergy crop soils.
Student:	Trish Eddie, 2010 – 2012. Michigan State University. Undergraduate student, formal advisor.
Project:	Gene-targeted amplicon sequencing of soil communities
Student:	Tobias Ortega-Knight, Summer, 2012. Michigan State University. Undergraduate student, formal advisor.
Project:	*De novo* assembly of human gut microbiome mock community
Student:	Danny Lynch, Summer, 2012. Michigan State University. Undergraduate student, formal advisor.
Project:	*De novo* assembly of yeast genome with digital normalization and *Trinity* assembler.

PROFESSIONAL SERVICE

Scientific Reviewer *BMC Bioinformatics*; *G3: Genes, Genomes, Genetics*, *International Society for Microbial Ecology*; *Molecular Ecology Resources; PLOS ONE*; *Biotechnology Journal*; and French Genomique Infrastructure Program. Reviewer for Graduate Women in Science. Program Committee member for SciPy 2014. Instructor and volunteer for Software Carpentry.

INDUSTRIAL EXPERIENCE

Exxon Mobil Production Company, US/East Operations Technology, New Orleans, Louisiana

Cummins Engine Company, High Horsepower Service Engineering, Columbus, Indiana

Cummins Engine Company, Apex Engineering Plant, Columbus, Indiana

AWARDS AND HONORS

Young Investigator Award Invited Oral Presentation, ASM, 2011.

Cold Spring Harbor Laboratories Course on Proteomics, Scholarship, 2008.

Center for Environmental Beneficial Catalysis Fellow, University of Iowa,

2004. Ross Fellowship, Purdue University, 2003.

PROFESSIONAL AFFILIATIONS

American Society for Microbiology

International Society for Microbial Ecology

Association of Environmental Engineering and Science Professors

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