

# CURRICULUM VITAE

## SASMITA MISHRA

Department of Environmental Sciences  
University of Toledo, MS 604  
Toledo, OH 43606, USA  
PHONE: 419-490-6816  
E-MAIL: sasmita.mishra@utoledo.edu

### EDUCATION:

**Ph.D.-2007:** Department of Botany, University of Delhi, Delhi, India

Specialization: Stress physiology, molecular biology and plant biotechnology

Thesis: "Molecular Analysis of Drought Stress Tolerance, *In Vitro* Clonal Propagation and Genetic Fidelity of Micropropagated *Populus x euramericana* Plants"

**M.Phil.-1998:** School of Life Sciences, Sambalpur University, India, in collaboration with Bose Research Institute, Kolkata, India

Specialization: Microbiology

Thesis: "Characterization of growth and activity of an isolated starch degrading bacterial strain"

**M.S.-1997:** School of Life Sciences, Sambalpur University, India

Specialization: Microbiology. Ancillary: Plant physiology, plant biotechnology, molecular biology and biochemistry

**B.S.-1994:** School of Life Sciences, Sambalpur University, India

Majors: Botany. Ancillary: Zoology and chemistry

### RESEARCH EXPERIENCE:

**May 2006-present:** Post-doctoral Research Associate in Plant and Algal Ecological Physiology & Biochemistry laboratory of Dr. Scott Heckathorn, Department of Environmental Sciences, University of Toledo, Toledo, OH.

Currently, I work on a project to develop antibody biomarkers and companion diagnostic assays for nutrient transport proteins to detect nutrient stress in plants prior to visible symptoms, for use in crop improvement, *etc.* (funded by USDA, PI = S Heckathorn). I also worked on a DOE-

funded bio-fuel project (Jul 2009- Jul 2010), wherein I was involved in selection and evaluation of diatom and green algae species from Lake Erie for lipid production.

**1999-2004:** Research Fellow, Department of Botany, University of Delhi, Delhi, India. I worked on the project “molecular analysis of drought tolerance for selection and *in vitro* propagation of tolerant genotypes of forest trees and crop plants”, funded by the Department of Science and Technology, New Delhi, India.

## **PUBLICATIONS:**

Mei Chen, **Sasmita Mishra**, Scott A. Heckathorn, Jonathan M. Frantz, Charles Krause. 2013. Proteomic analysis of *Arabidopsis thaliana* leaves in response to acute boron deficiency and toxicity reveals effects on photosynthesis, carbohydrate metabolism, and protein synthesis. *J Plant Physiology*. doi.org/10.1016/j.jplph.2013.07.008.

Scott A. Heckathorn, Anju Giri, **Sasmita Mishra**, Deepesh Bista. 2013. Heat stress and roots. Tuteja, Gill (Eds.): *Climate Change and abiotic stress tolerance*. Wiley-VCH Verlag, Germany, (in press) [invited book chapter].

**Sasmita Mishra**, Scott A. Heckathorn, Jonathan M. Frantz. 2012. Elevated CO<sub>2</sub> affects plant responses to variation in boron availability. *Plant Soil*. 350: 117-130.

Justin D. Chaffin, **Sasmita Mishra**, Rachel M. Kuhaneck, Scott A. Heckathorn, Thomas B. Bridgeman. 2011. Environmental controls on growth and lipid content for the freshwater diatom, *Fragilaria capucina*: a candidate for bio-fuel production. *J. Applied Phycology*. 24: 1045-1051.

Justin D. Chaffin, Thomas B. Bridgeman, Scott A. Heckathorn, **Sasmita Mishra**. 2011. Assessment of *Microcystis* growth rate potential and nutrient status across a trophic gradient in western Lake Erie. *J. Great Lakes Res.* 37: 92-100.

**Sasmita Mishra**, Scott A. Heckathorn, Jonathon M. Frantz; Futong Yu, John Gray. 2009. Effects of Boron deficiency on geranium grown under different nonphotoinhibitory light levels. *J. Amer. Soc. Hort. Sci.* 134(2): 183-193.

**Sasmita Mishra**, Scott A. Heckathorn, Deepak Barua, Dan Wang, Puneet Joshi, E. William Hamilton III and Jonathan M. Frantz. 2008. Interactive effects of elevated CO<sub>2</sub> and Ozone on leaf thermotolerance in field-grown *Glycine max*. *J. Integrative Plant Biol.* 50 (11): 1396–1405.

**Sasmita Mishra**, Niranjana Behera. 2008. Amylase activity of a starch degrading bacteria isolated from soil receiving kitchen wastes. *Afr. J. Biotech.* 7 (18): 3326-3331.

**Sasmita Mishra** and Sanjaya K. Mishra. 2006. Issues of industrial pollution, global warming threats to biodiversity: *In* Biswal, T (ed.) 'Human Rights, Gender and Environment'. Viva Books Private Ltd., New Delhi, pp. 403-438. (Book chapter)

### **Manuscripts in revision or final preparation:**

**Sasmita Mishra**, Scott A. Heckathorn, Jonathan M. Frantz, Charles Krause. 2013. Effects of growth light level on tolerance of *Pelargonium × hortorum* (Maverick White) to sub- and supra-optimal boron supply.

**Sasmita Mishra**, Scott A. Heckathorn, Jonathan M. Frantz, Charles Krause. 2013 The effects of boron, CO<sub>2</sub>, and light on levels of boron transport proteins, BOR1 and NIP5;1, indicate transporter-specific responses to both B and other plant resources.

**Sasmita Mishra**, Rachel M. Kuhaneck, Patty Armenio, Michele R. Phillips, Justin D. Chaffin, Deepesh R. Bista, Scott A. Heckathorn, Thomas B. Bridgeman. 2013. Environmental controls on growth and lipid content of the abundant bloom-forming diatom *Aulacoseira granulata*.

### **TECHNICAL SKILLS:**

#### **Bioinformatics**

Familiar with analyzing genomic- and proteomic-databases by using bioinformatics software, such as DNA STAR, MEGA 5.1, and open-access programs.

#### **Culture Techniques and Genetic Transformation**

Growing plants in hydroponics; culture and maintenance of algae and microorganisms. Hands-on experience in plant tissue culture (*Azadirachta indica*, *Populus x euramericana*, *Tecomella undulata*, *Pterocarpus marsupium*). Familiar with protoplast isolation and *Agrobacterium*-mediated transformation, screening of transformants.

#### **Molecular Biology**

DNA/RNA and plasmid isolation, Southern and Northern Hybridization, construction of libraries in plasmid vectors, primer designing, DNA-based screening, cloning, RAPD, real-time RT PCR,

DNA profiling and sequencing, SDS-PAGE (1D and 2D), Western blotting, protein purification, ELISA.

### **Physiological and Biochemical Techniques**

Familiar with techniques and instruments related photosynthesis measurements (*e.g.*, LiCor, chlorophyll fluorometry), and other physiological and biochemical assays.

### **Statistical analysis**

Familiar with SAS, JMP, and other statistical packages, like STATISTICA.

### **Computer Literacy**

MS-WORD, MS-Excel, MS-Power point, Adobe Photoshop, Corel Draw, Sigma Plot.

### **TRAINING / WORKSHOPS ATTENDED:**

Selected and attain the national level training program funded by Council of Science and Industrial Research (CSIR) at CIMAP, Lucknow, India, during the sessions for Winter School on Molecular Biology “Recent techniques in gene cloning, sequencing and DNA profiling” (20 - 29 November, 2000).

### **OTHER ACTIVITIES:**

**Listed Collaborator** on the project funded by the Ohio Plant Biotechnology Consortium (Jul 2012- Jul 2014)- “Development of novel antibody-based biomarkers and assays for nutrient metabolism proteins as tools for crop improvement and stress detection” (PI- Scott Heckathorn).

**Mentored** High School student, Rona Jiang, for her project on “Response of Azolla to boron toxicity”- Fall 2012 to summer 2013.

### **PROFESSIONAL SERVICES AND ACTIVITIES:**

Member of Ecological Society of America, joined in 2006.

Member of American Society of Horticultural Sciences, joined in 2008.

Life member of Delhi University Botanical Society, joined in 2001.

Member of Botanical Society of America, joined in 2012.

### **Reviewer for Professional Scientific Journals:**

Journal of Integrated Plant Biology: Special issue on climate change, 2008.

#### **PRESENTATIONS & PUBLISHED ABSTRACTS AT PROFESSIONAL MEETINGS:**

Anju Giri, **Sasmita Mishra**, Scott A. Heckathorn. Effects of abrupt heat stress on nutrient uptake by plant roots. Botanical Society of America, 2013, Abstract ID: 418.

**Sasmita Mishra**, Scott A. Heckathorn, Jonathan M. Frantz, John Gray. The effects of boron, light, CO<sub>2</sub>, and N on levels of boron-transport proteins, BOR1 and NIP5;1, indicate transporter-specific responses to both B and other plant resources. Botanical Society of America, 2012, Abstract ID: 484.

**Sasmita Mishra**, Scott A. Heckathorn, Jonathan M. Frantz, John Gray. Monitoring nutrient stress in plants using protein biomarkers and ELISA. American Society of Horticultural Science, 2011, Abstract No. 187.

**Sasmita Mishra**, Rachel Kuhaneck, Patricia Armenio, Deepesh Bista, Michele Phillips, Justin Chaffin, Scott A. Heckathorn, Thomas B. Bridgeman. 2011. Environmental controls on growth and lipid content of the abundant bloom-forming diatom *Aulacoseira granulata*: implications for algal blooms, food quality, and biofuel production. International Association of Great Lakes Research, 2011. Abstract ID: 1295553511.

Justin D. Chaffin, Thomas B. Bridgeman, Scott A. Heckathorn, **Sasmita Mishra**. 2010. Western Lake Erie *Microcystis* nutrient deficiencies in the large bloom of 2008. International Association of Great Lakes Research, 2010.

**Sasmita Mishra**, Scott A. Heckathorn, Jonathon M. Frantz, Futong Yu, John Gray. Modest increases in growth light level protect photosynthesis and plant growth during boron stress in geraniums. American Society of Horticultural Science, 2008. Abstract ID: 1278.

**Sasmita Mishra**, Saloni Shahana, Shrish C. Gupta. 2000. Rapid clonal propagation of a hybrid poplar- *Populus x euramericana* through leaf explants. International Conference on Biotechnology and Biodiversity. 2000. Abstract: p. 28, PTC-P2.

## REFERENCES:

Scott A. Heckathorn  
Professor  
Department of Environmental Sciences  
University of Toledo  
Toledo, OH 43606, USA  
Phone: 419-530-4328  
Email: [scott.heckathorn@utoledo.edu](mailto:scott.heckathorn@utoledo.edu)

Jonathon Frantz  
Research Associate  
Pioneer Hi-Bred International, Inc  
Johnston, IA 50131, USA  
Email: [jonathanfrantz319@gmail.com](mailto:jonathanfrantz319@gmail.com)

John Gray  
Associate Professor  
Department Biological Sciences  
University of Toledo  
Toledo, OH 43606, USA  
Phone: 419-530-1537  
Email: [jgray5@utnet.utoledo.edu](mailto:jgray5@utnet.utoledo.edu)