

# GRETCHEN ONSTAD, PhD

## ENVIRONMENTAL CHEMIST

DEPARTMENT OF ENVIRONMENTAL AND OCCUPATIONAL HEALTH SCIENCES  
UNIVERSITY OF WASHINGTON • BOX 357234 • SEATTLE, WA 98195-7234  
PHONE 206-616-9870 • E-MAIL GONSTAD@U.WASHINGTON.EDU

### EDUCATION

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- Ph.D. in Environmental Sciences and Engineering** December 2003  
University of North Carolina, Chapel Hill, NC
- B.S. in Chemistry** June 1997  
University of Washington, Seattle, WA

### RESEARCH EXPERIENCE AND EMPLOYMENT

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- Postdoctoral Research Fellow / Instructor** (Sept 2006 – present)  
University of Washington, Department of Environmental and Occupational Health Sciences, Seattle WA  
Advisor: **Dr. Christopher D. Simpson**
- Analytical chemistry method development for air pollution health effects studies
    - Detection of 3-nitrotyrosine biomarker in blood for diesel exposure assessment
    - Troubleshooting exposure apparatus for isocyanate challenge in asthma study at Harborview
  - Instructor for undergraduate course on environmental Sampling and Analysis (Winter 2007)
  - Funded by Labor & Industries, National Institute for Occupational Safety & Health (NIOSH) through an ERC training grant, and UW-Seattle.
- Postdoctoral Research Associate** (Mar 2003 – Dec 2005)  
Swiss Federal Institute of Aquatic Science and Technology (EAWAG), Dübendorf, Switzerland  
Advisor: **Dr. Urs von Gunten**
- European Union project “TOXIC: Barriers Against Cyanotoxins in Drinking Water”  
[www.cyanotox.com](http://www.cyanotox.com)
    - Established a Kinetic Database for oxidative (O<sub>3</sub>, ClO<sub>2</sub>, KMnO<sub>4</sub>) treatment of cyanotoxins
    - Evaluated the effects of water quality on toxin removal during drinking water treatment
  - Funded by the Swiss Federal Department for Education and Science
- Graduate Research Assistantship, Tuition and Stipend** (Aug 1998 – Feb 2003)  
University of North Carolina (UNC) Department of Environmental Sciences & Engineering.  
Dissertation Advisor: **Dr. Howard S. Weinberg**  
Dissertation Title: *Methods, Formation and Occurrence of Halogenated Furanones in U.S. Drinking Waters.*
- Methods development for the accurate detection and quantification of thirteen analogues of the mutagenic halogenated furanone MX by GC-ECD and GC-Ion Trap MS in a nationwide DBP occurrence study. Additional work included the chlorination of NOM isolates under Uniform Formation Conditions for disinfection byproduct studies, in collaboration with Dr. George Aiken, USGS Boulder, CO.
  - Funded by the US Environmental Protection Agency, Office of Research and Development, as part of project: “The Occurrence of Disinfection By-Products (DBPs) of Health Concern in Drinking Water: Results of a Nationwide DBP Occurrence Study.” Project Manager: **Susan Richardson**, National Exposure Research Laboratory, US EPA, Athens, GA. Principle Investigators: **Howard Weinberg** and **Philip Singer** (UNC), **Stuart Krasner** (MWDSC). Published as US EPA report: [www.epa.gov/athens/publications/EPA\\_600\\_R02\\_068.pdf](http://www.epa.gov/athens/publications/EPA_600_R02_068.pdf)

**Internship at Triangle Laboratories, Inc. (Durham, NC), Stipend** (Aug 1997 – 1998)

Advisor: **Dr. J. Ronald Hass**

- Interned at dioxin/PCB environmental testing laboratory. Trained with project managers, chemists, engineers, quality assurance and data reviewers. Gained experience in: Sample extraction and cleanup, Ion Chromatography (IC), Total Organic Halides (TOX), HRGC/HRMS, HPLC/MS/MS.

**Mary Gates Undergraduate Research Fellowship, Stipend** (March – June 1997)

University of Washington (UW), School of Oceanography, Seattle, WA.

Research Advisors: **Dr. John Hedges and Dr. Richard Keil**

- Lignin component analysis of fine suspended sediments from eastern US Rivers, collected by Don Canfield. Collected water samples from the Queets River on the Olympic Peninsula of Washington State and analyzed them for TOC, CHN, and lignin composition. Gained experience in sample collection, preservation, ultrafiltration, liquid-liquid extraction, and GC-FID analysis.

**Corps Member, King County World Conservation Corps., Seattle, WA** (June – Dec 1995)

- Worked with an international team on environmental restoration projects with the focus of enhanced water quality, such as planting trees as buffers along streams, building fences to keep ranch animals out of streams, and environmental outreach to communities—highlighting proper waste disposal for businesses and home owners. ([www.earthcorps.org/history.php](http://www.earthcorps.org/history.php)).
- Included one month **Internship** with King County Environmental Laboratory. Trace Organics Supervisor: **Dana Walker**.

**Undergraduate research project in the UW School of Oceanography** (March – June 1995)

Advisor: **Dr. Carol Stein**

- Employed geochemical modeling software (Geochemists Workbench) to determine that the source of arsenic to drinking water in community wells of Granite Falls, WA was natural, i.e. arsenopyrite, realgar or orpiment indigenous to local rock formations, and not due to mining operations at a neighboring quarry.

**NSF- Research Experience for Undergraduates Fellowship, Tuition and Stipend** (June – Aug 1993)

Advisor: **Dr. William Zoller** (UW Chemistry Department)

- Water quality survey of 13 lakes in the Puget Sound region of Washington State (pH, conductivity, dissolved oxygen, metal, nutrient, and organic carbon content). Gained experience in sample collection and analysis using the following instruments: ICP-AES, IC, DOC, CHN. Followed by monitoring nutrient cycling in Lake Washington for one year and preparing a Water Quality Monitoring slide show presentation for the UW Chemistry Dept. Science Outreach Program.
- Funded by the National Science Foundation

**PROFICIENCY WITH INSTRUMENTS AND CHEMICAL TECHNIQUES**

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HPLC-UV/DAD (Agilent, HP1100)	Competition Kinetics and Batch Ozonation
GC-Ion Trap MS/MS (Varian, Saturn III/2200)	Liquid-liquid and Solid phase extraction
GC-ECD, $\mu$ ECD or FID (Agilent/HP)	Total Organic Halide analysis (Dohrmann, TOX)
Ion Chromatography (Dionex)	Disinfection byproducts (THMs, HAAs, MX)
Nuclear Magnetic Resonance	TOC, CHN, and Lignin Analysis
( $^1\text{H}$ or $^{13}\text{C}$ NMR, Varian, Inova 500 or 600)	

**RELEVANT COURSEWORK**

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Environmental Organic Chemistry, Organic Geochemistry, Water Chemistry and Analysis, Limnology, Groundwater, Analytical Chemistry, Separations, Trace Organics, Analytical Spectroscopy, Humics Chemistry, Chemical Kinetics, College Teaching

## TEACHING EXPERIENCE

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### Instructor

- *Environmental Sampling and Analysis*, undergraduate course at UW-Seattle, Department of Environmental & Occupational Health Sciences, **Dr. Christopher Simpson** (Winter 2007)

### Guest lecturer

- *Environmental Chemical Modeling*, graduate course at UW-Seattle, Department of Environmental Engineering & Science, lectures on redox and kinetics, **Dr. Mark Benjamin** (April-May 2006)
- *Instrumental Methods for the Chemical Analysis of Environmental Samples*, graduate course at UNC-Chapel Hill, Department of Environmental Sciences & Engineering, section on Mass Spectrometry, taught lecture and laboratory sessions, **Dr. Howard Weinberg** (April 2001)

### Mentor

- Masters level student in chemistry at EAWAG, *Ozone kinetics of microcystin-LR* (March-May 2004)
- Undergraduate chemistry student at UNC, *Halogenated furanone analysis* (May-August 2002)

**College Teaching Course**, EDUC 257 completed, UNC School of Education (Spring 2001)

**Organic Chemistry Tutor** for blind student, UW Geophysics Dept., Seattle, WA (1995-1996)

### Science Outreach

- *Teacher of Water Quality Monitoring*, Native American Science Outreach Network (June – Sept 1994). Taught Native American high school students, and their teachers, how to monitor their local waterways for pH, alkalinity, chloride, nitrate, nitrite, phosphate, dissolved oxygen, temperature and total dissolved solids using LaMotte test kits. Explored links between native culture and science. Funded by the Puget Sound Water Quality Authority, Public Involvement and Education Fund. Advisor: **Dr. Sara Selfe**
- *Mentor, Teacher and Trainee* of UW Chemistry Dept. Science Outreach Program (1993-1995). Presented chemistry of *Chernobyl* and *Water Quality Monitoring* to local high school students. Trained other undergraduates to present talk on *Water Quality Monitoring*. **Dr. William Zoller**

## PEER-REVIEWED PUBLICATIONS

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Rodriguez E., Onstad G.D., Kull T.P.J., Metcalf J.S., Acero J.L., von Gunten U. (2007) Oxidative elimination of cyanotoxins: Comparison of ozone, chlorine, permanganate and chlorine dioxide. (Accepted for publication in *Water Research*)

Onstad G.D., Strauch S., Meriluoto J., Codd G., von Gunten U. (2007) Selective oxidation of key functional groups in cyanotoxins during drinking water ozonation. *Environmental Science and Technology*. In press.

Krasner S.W., Weinberg H.S., Richardson S.D., Pastor S.J., Chinn R., Scimmenti M.J., Onstad G.D., Thruston, Jr., A.D. (2006) Occurrence of a new generation of disinfection byproducts. *Environmental Science and Technology*. 40:7175-7185.

Ho L., Onstad G., von Gunten U., Rinck-Pfeiffer S., Craig K., Newcombe G. (2006) Differences in the chlorine reactivity of four microcystin analogues. *Water Research*. 40:6:1200-1209.

Onstad G.D. and Weinberg H.S. (2005) Evaluation of the stability and analysis of halogenated furanones in disinfected drinking waters. *Analytica Chimica Acta*. 534:2:281-292.

Onstad G.D., Canfield D., Quay P., and Hedges J.I. (2000) Sources of particulate organic matter in rivers from the continental USA: Lignin phenol and stable carbon isotope compositions. *Geochimica et Cosmochimica Acta*. 64:20:3539-3546.

PUBLICATIONS IN PREPARATION

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Onstad G.D., Weinberg H.S., Aiken G.R. Correlations Between Halogenated DBPs Generated from Chlorinated NOM Fractions. (in preparation for submission to Environ. Sci. Technol.)

Onstad G.D., Weinberg H.S., Singer P.C., Krasner S.W., Richardson S.D. Occurrence of Halogenated Furanones in Selected U.S. Drinking Water Treatment Plants. (in preparation for submission to Water Research)

PRESENTATIONS & PROCEEDINGS (\* NON PEER-REVIEWED PUBLICATIONS)

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Onstad G.D. (2006) Tracking DBP Formation and Removal in US Drinking Water Treatment Plants: MX and BMX analogues, *Gordon Research Conference: Drinking Water Disinfection By-products*, Mount Holyoke College, Massachusetts, August 13-18, 2006 (Poster presentation).

\*Onstad G.D. and von Gunten U. (2005) Ozonation of Cyanotoxins: Oxidation Kinetics and Applications. *American Water Works Association (AWWA) - Water Quality Technology Conference (WQTC) Proceedings-November 6-10, 2005*. Quebec City, Quebec, Canada.

\*Onstad G.D. and von Gunten U. (2005) Selective Oxidation and Detoxification of Cyanotoxins during Drinking Water Treatment. *17<sup>th</sup> International Ozone Association World Congress-August 22-25, 2005*. Strasbourg, France.

Onstad G.D. (2005) Oxidative Removal of Cyanotoxins during Drinking Water Treatment. *Natural Sciences Seminar at EAWAG on June 24, 2005*, Duebendorf, Switzerland.

*TOXIC: Barriers Against Cyanotoxins*, presented 4 progress report talks at European Union project meetings in Lisbon, Portugal (October 2003), Dundee, Scotland (September 2004), Amsterdam, The Netherlands (April 2005), and Karlsruhe, Germany (August 2005).

\*Onstad G.D., Weinberg H.S., Aiken G.R. (2003) Relationship Between Halogenated Furanones, HAAs, and THMs in Chlorinated Natural Organic Matter. *AWWA-WQTC Proceedings-November 2-6, 2003*. Philadelphia, PA.

Richardson S., Thruston A., Krasner S., Weinberg H.S., Chinn R., Scilimenti M.J., Pastor S., Onstad G.D. Disinfection by-products of health concern in drinking water: results of a U.S. Nationwide Occurrence Study. *International Mass Spectrometry Conference*, Edinburgh, Scotland, August 31 - September 5, 2003.

Krasner S., Chinn R., Pastor S., Scilimenti M., Weinberg H., Onstad G., Richardson S. (2002) The Occurrence of Disinfection By-Products of Health Concern in Drinking Water, *International Society of Exposure Analysis (ISEA)-International Society for Environmental Epidemiology (ISEE) Conference*, August 11-15, 2002, Vancouver, Canada.

\*Onstad G.D. and Weinberg H.S. (2001) Improvements in Extraction of MX-analogues from Drinking Water. *AWWA-WQTC Proceedings-November 11-14, 2001*. Nashville, TN.

Thruston Jr. A.D., Richardson S.D., Krasner S.W., Pastor S., Weinberg H.S., Onstad G.D. (2001) Occurrence of Disinfection By-Products in Drinking Waters-Preliminary Results of a Nationwide Study, *Proceedings of the 49th ASMS Conference on Mass Spectrometry and Allied Topics*, Chicago, Illinois, May 27-31, 2001 (Poster)

\*Onstad G.D., Weinberg H.S., and Richardson S.D. (2000) Evolution of an Analytical Method for the Detection of Halogenated Furanones in Drinking Water. *AWWA-WQTC Proceedings-November 5-9, 2000*. Salt Lake City, UT.

LANGUAGE AND COMPUTER SKILLS

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- Basic comprehension of Spanish and German
- Chemical Equilibria and Reaction Modeling Software (PHREEQ by USGS)

AWARDS

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- Dissertation Completion Fellowship (UNC-Chapel Hill Graduate School) 2002-2003
- Mary Gates Undergraduate Research Fellowship (UW-Seattle) 1997
- National Science Foundation – Research Experiences for Undergraduates Fellowship 1993
- Washington Scholar (tuition & fee waiver) 1992-1996

PROFESSIONAL MEMBERSHIPS

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- International Water Association (2003 – present)
- American Water Works Association (1998 – present)
- American Chemical Society (1997 – present)

REFERENCES

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Dr. Christopher D. Simpson      Assistant Professor, Environmental and Occupational Health Sciences  
University of Washington, F226C Health Sciences Center, Box 357234, Seattle, WA 98195-7234  
Tel: 206-543-3222      Fax: 206-616-2687      [simpson1@u.washington.edu](mailto:simpson1@u.washington.edu)

Dr. Urs von Gunten      Professor, Water Resources and Drinking Water  
Swiss Federal Institute of Aquatic Science and Technology,  
EAWAG, Ueberlandstrasse 133, P.O. Box 611, CH-8600 Dübendorf, Switzerland  
Tel ++41 44 823 5270      Fax ++41 44 823 5210      [urs.vongunten@eawag.ch](mailto:urs.vongunten@eawag.ch)

Dr. Howard S. Weinberg,      Assistant Professor, Environmental Sciences and Engineering  
University of North Carolina at Chapel Hill, Rosenau Hall, Chapel Hill, NC 27599-7431  
Tel # (919) 966-3859      Fax # (919) 966-7911      [howard\\_weinberg@unc.edu](mailto:howard_weinberg@unc.edu)