

Christina R. Young

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Education

Ph.D., Chemistry **2009 (expected)**

Georgia Institute of Technology, Atlanta, GA

Advisor: Assoc. Prof. Dr. Boris Mizaikoff

- FT-IR and quantum cascade laser based trace gas sensors for environmental and health applications

B.S., Chemistry, ACS Certified Degree **2005**

University of South Carolina, Columbia, SC

Academic Advisor: Prof. Dr. Scott Goode

Research Advisor: Prof. Dr. S. Michael Angel

- Laser-induced breakdown spectroscopy (LIBS) of analytes in seawater for hydrothermal vent analysis.

Employment

Georgia Institute of Technology, Atlanta, GA

Applied Sensors Laboratory

Advisor: Prof. Dr. Boris Mizaikoff

Graduate Research Assistant August 2005 - Present

- Project Leader – Mid-Infrared Trace Gas Sensors for Health and Environmental Analysis

- Designed and constructed chemical sensors for ExxonMobil Research and Engineering Company
- Collaborated with prominent universities, industries, and a national laboratory

ExxonMobil Research and Engineering Company, Annandale, NJ

Corporate Strategic Research

Reported to: Dr. Mark M. Disko

Graduate Research Collaborator October 2005 - Present

- Prepared quarterly technical reports on research progress
- Communicated results via quarterly oral presentations before panels of EMRE scientists, engineers, and managers
- Co-authored two internal industrial publications

Princeton University, Princeton, NJ

Department of Electrical Engineering

Advisor: Prof. Dr. Claire F. Gmachl

Applications Engineer Internship June-October 2008

- Co-invented a new method to optically tune quantum cascade laser emission resulting in enhanced chemical sensor sensitivity and selectivity (Appl. Phys. Lett. 94, 091109 (2009))
- Created a carbon dioxide sensor for biomedical diagnostic applications

ExxonMobil Biomedical Sciences, Inc. and EMRE, Annandale, NJ

Industrial Hygiene Division

Reported to: Dr. John L. Martin

Field Meas. Campaign Leader Aug, Oct-Dec 2006, May 2007

- Designed projects for and organized field measurement campaigns
- Fabricated field deployable chemical sensors for quantitative environmental monitoring
- Collaborated with team of experts from academia and industry

Georgia Institute of Technology, Atlanta, GA

Department of Chemistry and Biochemistry

Reported to: Prof. Dr. George McKelvy

Graduate Teaching Assistant August-December 2005

- Directed Chemistry 1310: Introduction to Chemistry Laboratory
- Instructed and mentored first-year college students

University of South Carolina, Columbia, SC

Department of Chemistry and Biochemistry

Advisor: Prof. Dr. S. Michael Angel

Undergraduate Research Assistant 2003 -2005

- Conducted research on LIBS of Aqueous Liquids at High Pressures
- Collaborated with a team of graduate research assistants to attain project goals

Awards and Recognition

- Coblentz Society on Vibrational Spectroscopy Graduate Student Award, **2009**
- American Association for the Advancement of Science (AAAS) Program for Excellence in Science Awardee, **2009**
- Georgia Tech School of Chemistry and Biochemistry Annual Graduate Symposium Competition: 3rd Place Oral Presentation Award, **2008**
- Society for Applied Spectroscopy Graduate Student Award, **2008**
- MIRTHE Annual Summer Workshop: 2nd Place Oral Presentation Graduate Student Award, **2008**
- Georgia Tech School of Chemistry and Biochemistry Nominee for P.E.O. Scholar Award, **2007**
- Piedmont Society for Applied Spectroscopy Student Travel Award to present an invited talk at FACSS, **2007**
- Southeastern Regional Meeting of the American Chemical Society (SERMACS) Travel Award, **2006**
- Federation of Analytical Chemistry and Spectroscopy Societies (FACSS) 1st Place Poster Award (first-author), **2006**
- FACSS 2nd Place Poster Award (co-author), **2006**
- Advanced Study Course on Optical Chemical Sensors (ASCOS) Travel Award at Tihany, Hungary, **2005**
- LIFE Academic Scholarship, University of South Carolina, **2000**
- Donnie H. Russell Scholarship, University of South Carolina, **2000**
- University of South Carolina-Aiken Scholar, **2000**
- Augusta State University Certificate of Achievement, **2000**

Selected Publications

1. **C. Young**, R. Cendejas, S. S. Howard, B. Mizaikoff, C. F. Gmachl. "Spectral Emission Tuning of InGaAs/AlInAs Buried-Heterostructure Quantum Cascade Lasers by Modifying Cavity Length". *Applied Physics Letters* (2009), 94, 091109.
2. **C. Young**, Y. Luzinova, S.-S. Kim, M. Weida, D. Arnone, E. Takeuchi, T. Day, B. Mizaikoff. "External Cavity Widely Tunable Quantum Cascade Laser Based Hollow Waveguide Gas Sensors for Multianalyte Detection". *Sensors and Actuators, B: Chemical*, (2008), In Press.
3. S.-S. Kim, N. Menegazzo, **C. Young**, J. Chan, C. Carter, B. Mizaikoff. "Mid-Infrared Trace Gas Analysis with Single-Pass FT-IR Hollow Waveguide Gas Sensors". *Applied Spectroscopy* (2008), 63(3), 331-337.
4. S.-S. Kim, **C. Young**, B. Mizaikoff. "Minaturized Mid-Infrared Sensor Technologies". *Analytical and Bioanalytical Chemistry* (2008), 390(1), 231-237.
5. A.E. Riley, **C. Young**, C.H. Brons, M.A. Francisco, B. Mizaikoff. "Design and Construction of a New Sensor Testing Technology". Official Internal Publication, ExxonMobil Research and Engineering Co. (2007).
6. A.E. Riley, J.L. Martin, **C. Young**, C.H. Brons, F.P. DiSanzo, J.L. Givens, N. Menegazzo, M.M. Disko, B. Mizaikoff. "2007 Field Trial of Next Generation Aromatics Sensors". Official Internal Publication, ExxonMobil Research and Engineering Co (2007).
7. G. Dobbs, B. Balamurali, **C. Young**, C. Kranz, D. Hess, B., Mizaikoff. "Mid-Infrared Chemical Sensors Utilizing Plasma-Deposited Fluorocarbon Membranes". *Analytical Chemistry* (2007), 79(24), 9566-957.
8. S.-S. Kim, **C. Young**, J. Chan, C. Carter, B. Mizaikoff. "Hollow Waveguide Gas Sensor for Mid-Infrared Trace Gas Analysis". *Proceedings of the IEEE Sensors* (2007).
9. **C. Young**, S. Hartwig, A. Lambrecht, S.-S. Kim, B. Mizaikoff. "Optimizing Gas Sensors Based on Quantum Cascade Lasers and Photonic Bandgap Hollow Waveguides". *Proceedings of the IEEE Sensors* (2007).

Book Chapters

C. Young, S.-S. Kim, B. Mizaikoff. "Quantum Cascade Laser Based Gas and Liquid Chemical Sensors", in Lasers in Chemistry, Maximillian Lackner, ed. 2008.

Conference Contributions

Oral Presentations

1. **C. Young**, B. Mizaikoff. "FT-IR and Quantum Cascade Laser Based Trace Gas Sensors". Georgia Institute of Technology School of Chemistry and Biochemistry Annual Graduate Research Symposium 2008, Atlanta, GA, October 2008. *Award Presentation*.
2. **C. Young**, C. Gmachl, B. Mizaikoff. "FT-IR and Quantum Cascade Laser Based Trace Gas Sensors". Federation of Analytical Chemistry and Spectroscopy Societies (FACSS) 2008, Reno, NV, October 2008. *Award Presentation*.
3. **C. Young**, W. Sanchez-Vaynshteyn, S. Howard, B. Mizaikoff, C. Gmachl. "Gas Phase Multianalyte Detection Using Quantum Cascade Laser Based Sensors". Mid-Infrared Technologies for Healthy and the Environment (MIRTHE) Summer Workshop, Baltimore, MD, August 2008.
4. **C. Young**, S.-S. Kim, Y. Luzinova, M. Weida, D. Arnone, E. Takeuchi, T. Day, B. Mizaikoff. "From FT-IR to Quantum Cascade Lasers: Hollow Waveguide Based Gas Sensors, Representations in Laboratory and Field". Europt(r)ode IX, Dublin, Ireland, April 2008.
5. S.-S. Kim, **C. Young**, Y. Luzinova, J.-H. Ryou, Y. Huang, R. Dupuis, S. Ralph, M. Weida, D. Arnone, E. Takeuchi, T. Day, B. Mizaikoff. "Towards Integrated Mid-Infrared Photonic Sensors". Pittsburgh Conference on Analytical Chemistry and Analytical Spectroscopy (PITTCON), New Orleans, LA, March 2008.

6. **C. Young**, S.-S. Kim, M. Weida, D. Arnone, E. Takeuchi, E., T. Day, B. Mizaikoff. "Widely Tunable Quantum Cascade Laser Based Hollow Waveguide Gas Sensors for Multianalyte Detection". Pittsburgh Conference on Analytical Chemistry and Analytical Spectroscopy (PITTCON), New Orleans, LA, March 2008.
7. S.-S. Kim, **C. Young**, J. Chan, C. Carter, B. Mizaikoff. "Hollow Waveguide Gas Sensor for Mid-Infrared Trace Gas Analysis". Institute of Electrical and Electronics Engineers (IEEE) Sensors, Atlanta, GA, October 2007.
8. **C. Young**, S. Hartwig, A. Lambrecht, A., S.-S. Kim, B. Mizaikoff. "Optimizing Gas Sensors Based on Quantum Cascade Lasers and Photonic Bandgap Hollow Waveguides". Institute of Electrical and Electronics Engineers (IEEE) Sensors, Atlanta, GA, October 2007.
9. **C. Young**, N. Menegazzo, C. H. Brons, A. Riley, J. L. Martin, M. Disko, B. Mizaikoff. "FT-IR Hollow Waveguide Gas Sensors for BTX Monitoring in Field Environments". Federation of Analytical Chemistry and Spectroscopy Societies (FACSS), Memphis, TN, October 2007. *Invited*.
10. M. Disko, A. E. Riley, D. C Calabro, A. M. Schilowitz, D. G. Yablon, C. H. Brons, M. A. Francisco, C. Rebick, **C. Young**, B. Mizaikoff. "Aromatics Sensing – Rapid Automated Trace Gas Sensor Testing". American Institute of Chemical Engineers (AIChE), Houston, TX, April 2007.
11. M. Disko, A. E. Riley, D. C Calabro, A. M. Schilowitz, D. G. Yablon, C. H. Brons, **C. Young**, B. Mizaikoff. "Aromatics Sensing – Emerging Methods for Recognition and Rapid Testing". International Forum on Process Analytical Technology (IFPAC), Baltimore, MD, January 2007.
12. **C. Young** and B. Mizaikoff. "Mid-Infrared Gas Sensors for BTEX Using Hollow Waveguides". Eastern Analytical Symposium, Somerset, NJ, November 2006.
13. M. Disko, A. E. Riley, D. C Calabro, A. M. Schilowitz, D. G. Yablon, C. H. Brons, M. G. Bird, J. L Martin, **C. Young**, B. Mizaikoff. "Advances in molecular recognition sensing of aromatics". Southeastern Regional Meeting of the American Chemical Society (SERMACS), Augusta, GA, November 2006.

14. **C. Young**, C. H. Brons, A. E. Riley, J. L. Martin, M. M. Disko, B. Mizaikoff. "Multivariate calibration of mid-infrared hollow waveguide gas sensors using automated gas mixing". Southeastern Regional Meeting of the American Chemical Society (SERMACS), Augusta, GA, November 2006.
15. B. Mizaikoff, **C. Young**, C. Charlton. "Trends in MidIR Sensing: From FTIR to Quantum Cascade Lasers". Federation of Analytical Chemistry and Spectroscopy Societies (FACSS), Orlando, FL, September 2006.

Poster Presentations

1. **C. Young**, R. Cendejas, S. S. Howard, W. Sanchez-Vaynshteyn, A.J. Hoffman, K. J. Franz, Y. Yao, B. Mizaikoff, X. Wang, J. Fan, C. F. Gmachl. "Enhancing Wavelength Selection for Quantum Cascade Laser Based Chemical Sensors by Cavity Length Variation". Conference on Lasers and Electro-Optics, Baltimore, MD June 2009 (Accepted).
2. **C. Young**, S.-S. Kim, Y. Luzinova, M. Weida, D. Arnone, E. Takeuchi, T. Day, B. Mizaikoff. "Analyzing Gas Mixtures With Widely Tunable Quantum Cascade Laser Based Hollow Waveguide Gas Sensors". Eurotrode IX, Dublin, Ireland, April 2008.
3. G. T. Dobbs, B. Balu, **C. Young**, A. Sinha, D. W. Hess, B. Mizaikoff. "Plasma-assisted Deposition of Fluorocarbon Films for Molecular Recognition Layers in Mid-Infrared Attenuated Total Reflection Chemical Sensors". Federation of Analytical Chemistry and Spectroscopy Societies (FACSS), Orlando, FL, September 2006. *Awarded Second-Place.*
4. **C. Young**, B. Mizaikoff. "Mid-Infrared Gas Sensors using Hollow Waveguides and Quantum Cascade Lasers". Federation of Analytical Chemistry and Spectroscopy Societies (FACSS), Orlando, FL, September 2006. *Awarded First-Place.*

Synergistic Activities

- **Science Fair Judge**
 - Atlanta Public Schools Science and Engineering Fair, North Atlanta HS, Atlanta, GA, Feb 2009
 - Cobb-Pauling County Regional Science Fair, Wheeler High School, Marietta, GA, Feb 2009
 - Rockdale County Science Fair, Rockdale Career Academy, Conyers, GA, Jan 2009
- **President of Session 2250:** Environmental: Air and Aerosols, PITTCON, Mar 2007
- **Chematix Chemical Inventory Supervisor**, Applied Sensors Laboratory, Aug 2006 – present
- **Research Lab Safety Captain**, Applied Sensors Laboratory, Aug 2005 – present

Professional Affiliations

- American Chemical Society, Analytical Chemistry Division
- Society for Applied Spectroscopy
- Piedmont Section of Society for Applied Spectroscopy
- The Coblentz Society on Vibrational Spectroscopy
- Optical Society of America (OSA)
- American Association for the Advancement of Science (AAAS)
- IEEE and IEEE Photonics Society Student Member
- LEOS Student Member