

CURRICULUM VITAE

DR. HUIWANG AI

Assistant Professor (07/2011-present)

Department of Chemistry

Institute for Integrative Genome Biology (IIGB)

Faculty Member of Environmental Toxicology (ETOX) graduate program,
and Cell, Molecular and Developmental Biology (CMDDB) graduate program

Cooperating faculty member of Biochemistry, and Biomedical Sciences

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Research interests

- Molecular probes for redox signaling and oxidative/nitrosative stress
- Fluorescent probes for brain signaling
- Unnatural peptide/protein based therapeutic agents

Education and training

- 07/2008-06/2011 Research Associate, The Scripps Research Institute, La Jolla, USA
Advisor: Peter G. Schultz
- 09/2003-06/2008 Ph.D. in Chemical Biology from Department of Chemistry,
University of Alberta, Edmonton, Canada
Advisor: Robert E. Campbell; Thesis titled "*New Fluorescent Proteins
and Genetically Encoded Biosensors*"
- 09/1999-07/2003 B.Sc. from Department of Chemistry, Tsinghua University, Beijing,
China

Publications

Publications at UCR

39. S. Youssef, W. Ren, and H-w. Ai*, "A Genetically Encoded FRET Sensor for Hypoxia and Prolyl Hydroxylases", *submitted to ACS Chem. Biol.*.
38. Z. Chen, and H-w. Ai*, "Single Fluorescent Protein Based Biosensors for Zinc Ion", *submitted to Analytical Chemistry*.
37. Z. Chen, Z. Tian, K. Kallio, A.L. Oleson, A. Ji, D. Borchardt, D. Jiang, S.J. Remington, H-w. Ai*. "The N-B Interaction: Understanding the Chemoselectivity of a Fluorescent Protein Based Probe for Peroxynitrite". *J. Am. Chem. Soc.*. 2016, 138: 4900–4907.

36. W. Ren, and H-w. Ai*, "Photocontrol of the Src Kinase in Mammalian Cells with a Photocaged Intein", accepted by *Methods in Molecular Biology*.
35. Y. Fan, and H-w. Ai*, "Development of redox-sensitive red fluorescent proteins for imaging redox dynamics in cellular compartments", *Anal. Bioanal. Chem.* 2016, 408: 2901-2911. Selected by the Editor as a "Paper in Forefront".
34. W. Ren, A. Ji, O. Karmach, D. Carter, M. Martins-Green*, and H-w. Ai*, "A Membrane-Activatable Near-Infrared Fluorescent Probe with Ultra-Photostability for Imaging Mitochondrial Membrane Potential", *Analyst*, 2015, DOI: 10.1039/C5AN01860A. To be included in a special issue featuring 'Analyst Emerging Investigators' (Royal Society of Chemistry).
33. W. Ren, A. Ji, and H-w. Ai*, "Expanding the Genetic Code for a Dinitrophenyl Hapten", *ChemBioChem*, 2015, 16: 2007-2010.
32. W. Ren, T. Truong and H-w. Ai*, "Study of the Binding Energies between Unnatural Amino Acids and Engineered Orthogonal Tyrosyl-tRNA Synthetases", *Sci. Rep.*, 2015, 5: 12632.
31. Y. Fan,[§] Z. Chen,[§] and H-w. Ai*, "Monitoring Redox Dynamics in Living Cells with a Redox-Sensitive Red Fluorescent Protein", *Anal. Chem.*, 2015, 87: 2802-2810. (§equal contribution)
30. W. Ren,[§] A. Ji,[§] and H-w. Ai*, "Light Activation of Protein Splicing with a Photocaged Fast Intein", *J. Am. Chem. Soc.*, 2015, 137: 2155-2158. (§equal contribution)
29. Z. Chen, T. Truong and H-w. Ai* "Development of Fluorescent Probes for the Detection of Peroxynitrite", book chapter in *Challenges and Advances of Peroxynitrite Detection in Biological Media*. Royal Society of Chemistry (RSC) Publishing. Published on Oct. 21, 2015.
28. H-w. Ai*, "Fluorescent protein-based probes: General principles and practices", *Anal. Bioanal. Chem.*, 2014, 2015, 407: 9-15.
27. H-w. Ai*, "Editorial: Fluorescent Sensors for Biological Applications", *Sensors*, 2014, 14: 17829-17831.
26. Z. Chen and H-w. Ai*, "A Highly Responsive and Selective Fluorescent Probe to Image Physiological Hydrogen Sulfide", *Biochemistry*, 2014, 53: 5966-5974.
25. A. Ji,[§] W. Ren,[§] and H-w. Ai*, "A Highly Efficient Oxidative Condensation Reaction for Selective Protein conjugation", *Chem. Commun*, 2014, 50: 7469-7472 (§equal contribution)
24. H-w. Ai, M.A. Baird, Y. Shen, M.W. Davidson and RE Campbell*, "Engineering and characterizing monomeric fluorescent proteins for live-cell imaging applications", *Nature Protocols*, 2014, 9: 910-928.
23. W. Ren, and H-w. Ai*, "Genetically encoded fluorescent redox probes", *Sensors*,

- 2013, 13: 15422-15433.
22. Z. Chen, W. Ren, Q.E. Wright and H-w. Ai*, "Genetically Encoded Fluorescent Probe for the Selective Detection of Peroxynitrite", *J. Am. Chem. Soc.*, 2013, 135: 14940-14943.
 21. A. Chatterjee, H. Xiao, M. Bollong, H-w. Ai and P.G. Schultz*, "Efficient viral delivery system for unnatural amino acid mutagenesis in mammalian cells", *Proc. Natl. Acad. Sci. USA.*, 2013, 110: 11803-11808.
 20. S. Chen, Z. Chen, W. Ren and H-w. Ai,* "Reaction-based genetically encoded fluorescent hydrogen sulfide sensors", *J. Am. Chem. Soc.*, 2012, 134: 9589-9592.
 19. W. Ren and H-w. Ai,* "Ribosomal Incorporation of Unusual Amino Acids: Learning from Mother Nature", book chapter in *Ribosomes: Molecular Structure, Role in Biological Functions and Implications for Genetic Diseases*. Nova Science Publishers. Published on May 3, 2013.
 18. H-w. Ai,* "Biochemical analysis with the expanded genetic lexicon", *Anal. Bioanal. Chem.*, 2012, 403: 2089-2102. *Special Issue Featuring 'Young Investigators in Analytical and Bioanalytical Science'*.

Before coming to UCR

17. M. Kang,[§] K. Light,[§] H-w. Ai,[§] W. Shen, C.H. Kim, P.R. Chen, H.S. Lee, E.I. Solomon, and P.G. Schultz, "Evolution of Iron(II)-Finger Peptides by Using a Bipyridyl Amino Acid", *ChemBioChem*, 2014, 15: 822-825. ([§]equal contribution)
16. Y. Ding, H-w. Ai, H. Hoi, and R.E. Campbell, "FRET-based biosensors for multiparameter ratiometric imaging of Ca²⁺ dynamics and caspase-3 activity in single cells", *Anal. Chem.*, 2011, 83: 9687-9693.
15. H-w. Ai[§], W. Shen[§], A. Sagi, P.R. Chen and P.G. Schultz, "Probing protein-protein interactions with a genetically encoded photocrosslinking amino acid", *ChemBioChem*, 2011, 12: 1854-1857. ([§]equal contribution)
14. H-w. Ai[§], J.W. Lee[§], and P.G. Schultz, "A method to site-specifically introduce methyllysine into proteins in *E. coli*", *Chem. Comm.*, 2010, 46: 5506-5508. ([§]equal contribution)
13. H-w. Ai, W. Shen, E. Brustad, and P.G. Schultz, "Genetically encoded alkenes in yeast", *Angew. Chem. Int. Ed.*, 2010, 49: 935-937.
12. D.E. Johnson[§], H-w. Ai[§], P. Wong, J.D. Young, R.E. Campbell and J.R. Casey, "Red fluorescent protein pH biosensor to detect concentrative nucleoside transport", *J. Biol. Chem.*, 2009, 284: 20499-20511. ([§]equal contribution)
11. H-w. Ai, K.L. Hazelwood, M.W. Davidson and R.E. Campbell, "Fluorescent protein FRET pairs for ratiometric imaging of dual biosensors", *Nature Methods*, 2008, 5: 401-403. *News story featured on the cover of October 2008 issue of Biophotonics.*
10. H-w. Ai, S.G. Olenych, P. Wong, M.W. Davidson, and R.E. Campbell, "Hue-shifted

- monomeric variants of *Clavularia* cyan fluorescent protein: identification of the molecular determinants of color and applications in fluorescence imaging”, *BMC Biology*, 2008, 6, 13. ‘Highly accessed’ article.
9. Y. Li, A.M. Sierra, H-w. Ai, and R.E. Campbell, “Identification of sites within a monomeric red fluorescent protein that tolerate peptide insertion and testing of corresponding circular permutations”, *Photochemistry and Photobiology*, 2008, 84, 111-119.
 8. H-w. Ai, and R.E. Campbell, “Teal fluorescent proteins: Characterization of a reversibly photoswitchable variant”, *Proceedings of SPIE*, 2008, 6868:68680D.
 7. H-w. Ai and R.E. Campbell, “More than just pretty colors: the growing impact of fluorescent proteins in the life sciences”, *Biotechnology Focus*, 2007, 10 (11), 16-18.
 6. H-w. Ai, N.C. Shaner, Z. Cheng, R.Y. Tsien and R.E. Campbell, “Exploration of new chromophore structures leads to the identification of improved blue fluorescent proteins”, *Biochemistry*, 2007, 46, 5904-5910. *The 9th of Biochemistry’s most accessed articles in 2007.*
 5. J.N. Henderson, H-w. Ai, R.E. Campbell, and S.J. Remington, “Structural basis for reversible photobleaching of a green fluorescent protein homologue”, *Proc. Natl. Acad. Sci. USA.*, 2007, 14, 6672-6677. *News story in June 2007 issue of Biophotonics and April 2007 ScienceDaily online.*
 4. H-w. Ai, J.N. Henderson, S.J. Remington, and R.E. Campbell, “Directed evolution of a monomeric, bright, and photostable version of *Clavularia* cyan fluorescent protein: structural characterization and applications in fluorescence imaging”, *Biochem. J.*, 2006, 400, 531-540.
 3. J.Y. Bao, H-w. Ai, H. Fu, Y.Y. Jiang, Y.F. Zhao and C. Huang, “Peptide sequencing through N-terminal phosphorylation and electrospray ionization mass spectrometry”, *J. Mass Spec.*, 2005, 40, 772-776.
 2. H-w. Ai, H. Fu, and Y.F. Zhao, “Novel synthetic method of phosphoramidate peptides and its application in peptide sequencing *via* multistage mass spectrometry”, *Chem. Comm.*, 2003, 21, 2724-2725.
 1. Z.W. Miao, H. Fu, G.Z. Tu, J.G. Zhu, H-w. Ai, and Y.F. Zhao, “A stepwise one-pot synthesis of aryl N-phosphoramidothionate derivatives of nucleosides”, *Hetero. Chem.*, 2003, 14, 62-66.

Patent and technology transfer

1. R.E. Campbell and H-w. Ai, “Teal Fluorescent Proteins” United States Patent Application No. 11/419,437. Filed: May 19, 2006. Issued 7 September 2010; US Patent No: 7,790,868 (Issued September 7, 2010) and 7,935,801 (Issued May 3, 2011). *Allele Biotech* (San Diego, CA) is the licensed distributor of the genes

- encoding mTFP1 and mWasabi.
2. Anaptys Biosciences (La Jolla, CA) has licensed the right to use the gene encoding mTFP1 (publication #4) for private research; Genentech (Oceanside, CA) has been approved for the usage of EBFP2 (publication #6) for research purpose; mKalama1 and EBFP2 (publication #6), mAmetrine (publication #11), and mNectarine (publication #12) are distributed through Addgene (Cambridge, MA).
 3. pnGFP (publication #21), hsGFP (publication #25), pMAH2-CageCys (publications #30 and #36) and rxRFPs (publications #29 and #35) are distributed through Addgene (Cambridge, MA).

Awards and honors

- Emerging Investigator, The Analyst Themed Issue, 2016
- Young Investigator in Analytical and Bioanalytical Science, Analytical and Bioanalytical Chemistry Themed Issue, 2016
- National Science Foundation CAREER award, May 2014
- Hellman Fellows Award, The Hellman Fellows Fund, July 2013
- Young Investigator in Analytical and Bioanalytical Science, Analytical and Bioanalytical Chemistry Themed Issue, 2012
- The UCR Academic Senate Regents' Faculty Fellowship (RFF), June 2012.
- Robert T. Poe Faculty Development Award, The Chinese American Faculty Association of Southern California, February 2012.
- *Andrew Stewart* Memorial Graduate Prize, Faculty of Graduate Studies and Research, University of Alberta, May 2008.
- Professional Development Grant, University of Alberta, May 2007
- *Mary Louise Imrie* Graduate Student Award, University of Alberta, March 2007

Oral presentations

39. H-w. Ai, Oregon State University, scheduled, May 4, 2016
38. H-w. Ai, Texas A&M, scheduled, April 29, 2016
37. H-w. Ai, Baylor College of Medicine, scheduled, April 27, 2016
36. H-w. Ai, California State University Long Beach, scheduled, April 6, 2016
35. H-w. Ai, University of Missouri, Scheduled, April 4, 2016
34. H-w. Ai, University of Kansas, Scheduled, April 1, 2016
33. H-w. Ai, "Molecular Probes for redox signaling and oxidative stress". *Department of Chemistry, University of Alberta, Edmonton, AB, March 23, 2016.*
32. H-w. Ai, "Molecular Probes for redox signaling and oxidative stress". *The 251th ACS National Meeting and Exposition, San Diego, California, March 13, 2016.*
31. H-w. Ai, "Molecular Probes for redox signaling and oxidative stress". *Department*

- of Chemistry, University of Pittsburgh, Pittsburgh, PA, March 3, 2016.*
30. H-w. Ai, "Molecular Probes for redox signaling and oxidative stress". *Department of Chemistry, University of New Mexico, Albuquerque, NM, Feb. 26, 2016.*
 29. H-w. Ai, "Molecular Probes for redox signaling and oxidative stress". *Department of Chemistry, University of California Davis, Davis, CA, Feb. 24, 2016.*
 28. H-w. Ai, "Molecular Probes for redox signaling and oxidative stress". *Society of Western Analytical Professors 2016 Meeting, Riverside, CA, Jan. 30, 2016.*
 27. H-w. Ai, "Molecular Probes for redox signaling and oxidative stress". *Department of Chemistry, University of Southern California, Los Angeles, CA, Jan. 28, 2016.*
 26. H-w. Ai, "Molecular Probes for redox signaling and nitrosative stress". *Pacificchem 2015, Honolulu, Hawaii, Dec. 15, 2015.*
 25. H-w. Ai, "Molecular Probes for redox signaling and oxidative stress". *Department of Chemistry, University of Notre Dame, Notre Dame, IN, Dec. 4, 2015.*
 24. H-w. Ai, "Molecular Probes for redox signaling and oxidative stress". *Department of Chemistry, Purdue University, West Lafayette, IN, Dec. 1, 2015.*
 23. H-w. Ai, "Molecular Probes for redox signaling and oxidative stress". *Department of Chemistry, Boston College, Boston, MA, Nov. 10, 2015.*
 22. H-w. Ai, "Molecular Probes for redox signaling and oxidative stress". *Department of Chemistry, Boston University, Boston, MA, Nov. 9, 2015.*
 21. H-w. Ai, "Directed Protein Evolution in the Ai Lab at UCR". *City of Hope-UC Riverside Biomedical Research Initiative Workshop, City of Hope, Duarte, CA, Oct. 17, 2015.*
 20. H-w. Ai, "Molecular Probes for redox signaling and oxidative stress". *Department of Chemistry, University of Texas at El Paso, El Paso, TX, Sep. 25, 2015.*
 19. H-w. Ai, "Molecular Probes for redox signaling and oxidative stress". *Department of Chemistry, Tongji University, Shanghai, China, Sep. 1, 2015.*
 18. H-w. Ai, "A fluorescent toolkit for redox signaling and oxidative stress". *UCR Biomedical Sciences Seminar, University of California Riverside, Riverside, California, June 5, 2015.*
 17. H-w. Ai, "Expanding genetically encoded fluorescent protein-based redox probes" *CMDB Seminar, University of California Riverside, Riverside, California, Jan. 5, 2015.*
 16. H-w. Ai, "A Membrane-Activatable Near-Infrared Fluorescent Probe for Mitochondrial Membrane Potential". *Department of Chemistry, University of California Riverside, Riverside, California, Oct. 10, 2014.*
 15. H-w. Ai, "Fluorescent Protein Based Redox Probes". *The 248th ACS National Meeting and Exposition, San Francisco, California, Aug. 11, 2014.*
 14. H-w. Ai, "Fluorescent Protein Based Probes: an Unnatural Approach". *The 97th Canadian Chemistry Conference and Exhibition, Vancouver, British Columbia, June 5, 2014.*
 13. H-w. Ai, "Fluorescence Redox Probes for Imaging Signaling in Living Cells".

- Society of Western Analytical Professors 2014 Meeting, Arizona State University, Tempe, Arizona, Jan. 10, 2014.*
12. H-w. Ai, "Fluorescent Tools for Cell Redox Signaling and a Click-Type Bioconjugation Reaction". *Department of Chemistry, Colorado State University, Fort Collins, Colorado, Oct. 9, 2013.*
 11. H-w. Ai, "Fluorescence Imaging of Redox Signaling in Living Cells". *Department of Chemistry, University of California Riverside, Riverside, California, Oct. 3, 2013.*
 10. H-w. Ai, "Fluorescence Imaging of Redox Signaling in Living Cells". *Environmental Toxicology Seminar, University of California Riverside, Riverside, California, May 29, 2013.*
 9. H-w. Ai, "Fluorescent Probes for Intracellular ROS and H₂S". *Department of Chemistry, University of California Riverside, Riverside, California, Oct. 18, 2012.*
 8. H-w. Ai, "Novel Encodable Probes for Fluorescence Imaging of ROS and H₂S in Cells", *Institute for Integrative Genome Biology (IIGB), University of California Riverside, California, Oct 5, 2012.*
 7. H-w. Ai, "Fluorescence imaging of H₂S and ROS in cells: an indicative pathway to S-sulphydration", invited departmental seminar, *Department of Chemistry and Biochemistry, San Diego State University, San Diego, California, September 28, 2012.*
 6. H-w. Ai, "Reaction-based fluorescent biosensors for H₂S and H₂O₂", the *American Chemical Society 243rd National Meeting & Exposition, San Diego, California, March 25-29, 2012.*
 5. H-w. Ai, "Fluorescent biosensors for chemicals of environmental and biological interests". *Department of Chemistry, University of California Riverside, Riverside, California, Oct. 06, 2011.*
 4. H-w. Ai, "Fluorescent proteins and expanded genetic codes: analyzing cellular dynamics with genetically encoded molecular tools". Job search talks in eleven U.S. and Canadian universities, from October 2010 to February 2011.
 3. H-w. Ai, "Expanding the fluorescent protein 'toolkit': new FRET pairs for live cell imaging". Invited oral presentation in *Division of Analytical and Environmental Toxicology, Faculty of Medicine and Dentistry, University of Alberta, Edmonton, Alberta, June 20, 2008.*
 2. H-w. Ai, "Selecting fluorescent proteins for photostability: new colors and FRET pairs". Oral presentation at the *BiOS (Biomedical Optics Symposium) 2008 of SPIE, San Jose, CA, Jan. 19-24, 2008.*
 1. H-w. Ai, "Improved blue and cyan fluorescent proteins with tyrosine-derived chromophores". Oral presentation at the *2006 Volcano Bioorganic Conference, Pack Forest Washington, Feb. 25-26, 2006.*

Poster presentations

8. H-w. Ai*, "Red, Far-red, and Infrared(IR) Fluorescent Redox Sensors". Poster

- presentation at the *2015 Gordon Research Conference in Bioorganic Chemistry*, June 7-12, 2015, Proctor Academy, Andover, NH.
7. H-w. Ai*, "Reaction-based genetically encoded fluorescent hydrogen sulfide and peroxide sensors". Poster presentation at the *2012 Gordon Research Conference for Thiol-Based Redox Regulation & Signaling*, July 29-Aug 3, 2012, Bates College, Lewiston, ME.
 6. H-w. Ai, and P.G Schultz. "Engineering protein structural elements and mapping protein-protein interactions with the expanded genetic code". Poster presentation at the *2010 Bioorganic Chemistry Gordon Research Conference*, June 13-18, 2010, Proctor Academy, Andover, NH.
 5. H-w. Ai, and R.E. Campbell. "New members in the fluorescent protein toolbox: evolution and application". Poster presentation at the *Janelia Farm Research Campus conference on Fluorescent Proteins & Biological Sensors*, Oct. 28-31, 2007, Howard Hughes Medical Institute, Ashburn, VA.
 4. H-w. Ai, and R.E. Campbell, "Filling the fluorescent protein toolbox: new colors for construction of orthogonal biosensors". Poster presentation at the *2007 Graduate Student Recruitment poster session*, Aug. 29, 2007. Also presented by REC at the *2007 Bioorganic Gordon Conference* held at Proctor Academy, Andover, New Hampshire, June 10-15, 2007.
 3. H-w. Ai, P. Wong and R.E. Campbell, "New genetically encoded fluorophores for multicolor live cell imaging". Poster presentation at the *American Chemical Society 233rd National Meeting & Exposition*, Chicago, March 25-29, 2007.
 2. H-w. Ai and R.E. Campbell, "Improved blue and cyan fluorescent proteins with tyrosine-derived chromophores". Poster presentation at the *6th International Conference of the Canadian Proteomics Initiative*, Edmonton, Alberta, May 10-12, 2006. Also presented by REC at the *4th annual CIHR Institute of Genetics New Principal Investigators meeting*, Jackson's Point, Ontario, Nov 4-6, 2005.
 1. H-w. Ai and R.E. Campbell, "An improved cyan fluorescent protein with a tyrosine-derived chromophore". Poster presentation at the *48th CSBMCB Annual Meeting on Cellular Dynamics*, Banff, Alberta, March 16-20, 2005.

Meetings

- The 251th ACS National Meeting and Exposition, San Diego, California, March 13-17, 2016.
- Society of Western Analytical Professors 2016 Meeting, Riverside, CA, Jan. 29-30, 2016.
- Pacifichem 2015, Honolulu, Hawaii, Dec. 15-20, 2015.
- City of Hope-UC Riverside Biomedical Research Initiative Workshop, City of Hope, Duarte, CA, Oct. 17, 2015.
- The 2015 Bioorganic Chemistry Gordon Research Conference, Proctor Academy,

Andover, NH, June 7-12,, 2015.

- The 248th ACS National Meeting and Exposition, San Francisco, California, Aug. 10-14, 2014
- The 97th Canadian Chemistry Conference and Exhibition, Vancouver, British Columbia, June 1-5, 2014.
- Society of Western Analytical Professors 2014 Meeting, Arizona State University, Tempe, Arizona, Jan 9-10, 2014.
- The 2012 Gordon Research Conference for Thiol-Based Redox Regulation & Signaling, July 29-Aug 3, 2012, Bates College, Lewiston, ME.
- The 243rd American Chemical Society National Meeting, San Diego, CA, March 25-29, 2012
- The 2010 Bioorganic Chemistry Gordon Research Conference, Proctor Academy, Andover, NH, June 13-18, 2010.
- The BiOS (Biomedical Optics Symposium) 2008, San Jose, CA, Jan. 19-24, 2008.
- The Janelia Farm Research Campus Conference on Fluorescent Proteins & Biological Sensors, Howard Hughes Medical Institute, Ashburn, VA, Oct. 28-31, 2007,
- The First Canada-China Symposium on Analytical Chemistry for Life Sciences, Edmonton, Alberta August 20-23, 2007.
- The 2007 American Chemical Society National Meeting, Chicago, March 25-29, 2007
- The Canadian Proteomics Initiative, Edmonton, Alberta, May 10-12, 2006.
- The 2006 Volcano Bioorganic Conference, Pack Forest Washington, Feb. 25-26, 2006.
- The 48th CSBMCB Annual Meeting, Banff, Alberta, March 16-20, 2005
- CIHR group in protein structure and function special symposium on Frontiers in Structural Biology, Faculte St. Jean, University of Alberta, May 6-7, 2004

Additional trainings

- HHMI/National Academies Scientific Teaching Summer Institute, Riverside, CA, June 22-27, 2014
- NIH (NIGMS) Mentoring Workshop for New Faculty in Organic and Biological Chemistry, Dallas, TX, June 25-27, 2012
- Teaching Workshop by the UCR Academy of Distinguished Teachers, April 20, 2012.
- The International 3D microscopy of Living cells Course, Vancouver, British Columbia, June 10-25, 2006.

Teaching experience

- Winter 2015 and Winter 2016, Bioorganic Chemistry (CHEM 143)
- Fall 2013 and Fall 2014, Optical Spectroscopy (CHEM 221B)
- Fall 2012, Fall 2013, Fall 2014 and Fall 2015, Instrumental Methods of Analysis-Laboratory (CHEM 125L)

- Winter 2012 and Winter 2013, General Chemistry (CHEM 1B)
- Fall 2011 and Fall 2012, Bioanalytical Chemistry (CHEM 221E)

Experience to review grants

- NSF Peer Review Panel “Chemical Probes of Biological Processes-P151195”, Feb 2015
- Grant Review for Canada Foundation for Innovation, September 2012
- Grant Review for Czech Science Foundation, September, 2012

Other experience and professional memberships

- 2007-present Member, American Chemical Society (ACS)
- 2012-present Member, American Association for the Advancement of Science (AAAS)
- 2013-present Referee Editor for *Frontiers in Chemistry* (Chemical Biology section)
- 2014-present Member of the AB SCIEX Innovation Advisory board
- 03/2016 Symposium Chair, the 251st ACS National Meeting. Symposium titled: “Luminescent proteins, dyes, and sensors”
- 01/2016 Co-organizer, the 47th annual meeting for the Society of Western Analytical Professors (SWAP)
- 08/2014 Associate Symposium Chair, the 248th ACS National Meeting. Session titled: “Pro-fluorogenic probe-based methods for disease detection”
- 03/2013 Guest Editor for the journal *Sensors* (ISSN 1424-8220) for a special issue on “fluorescent biosensors”
- 03/2012 Symposium Chair, the 243rd ACS National Meeting. Symposium titled: “Fluorescent imaging of cellular structures and dynamics”

Additional activities

- Reviewer for *ACS Chemical Biology*, *Analytical Chemistry*, *Biochemistry (ACS)*, *Chemical Communications*, *Organic & Biomolecular Chemistry*, *Organic Letters*, *Molecular BioSystems*, *Journal of Materials Chemistry*, *Journal of the American Chemical Society*, *Chemical Society Reviews*, and *Nature Chemical Biology*.
- Consultant for SafeWhite, Inc (2015)
- Graduate Student Admission Committee Member of UCR ETOX (2011-2014), CMDB (2012) and Chemistry (2014)
- UCR Department of Chemistry Kohler Lecturer Committee Member (2012)
- UCR Committee on International Education Member (since 2014)
- Qualifying/Oral Exam Committee member, Thesis Committee member, and 2nd Year Oral Exam Committee member for more than 30 UCR graduate students in several graduate programs.

Research Support (Ongoing):

National Science Foundation CHE-1351933 CAREER: Expanding the Toolbox of Encodable Macrophage Redox Dynamics Role: PI	Ai (PI)	05/01/2014-04/30/2019 Fluorescent Probes to Image \$600,000
National Institute of Health R03EB20211 Lentiviral Systems for Controlled Mammalian Expression of Unnatural Protein Probes Role: PI	Ai (PI)	03/01/2015-12/31/2016 \$152,000
Yetongren Medical Group Unlimited Research Gift Role: PI	Ai (PI)	07/01/2013-06/30/2016 \$145,000
National Institute of Health R01GM118675 A Fluorescent Toolkit for Imaging Reactive Oxygen Species (ROS) Role: PI	Ai (PI)	04/01/2016-03/31/2020 \$1,398,400
National Institute of Health R21EB021651 Expansion of Unnatural Fluorescent Protein Probes Role: PI	Ai (PI)	07/01/2016-06/30/2018 \$387,188 (above payline)

Research Support (Complete):

Collaborative Seed Grant, UCR Redox Reporter-Modified Human Stem Cells for Assessing Environmentally Induced Oxidative Stress Role: PI	Ai (PI)	07/01/2015-12/31/2015
Collaborative Seed Grant, UCR Luciferin Engineering for Bioassays Role: Co-PI	Pirrung (PI)	07/01/2015-12/31/2015
Collaborative Seed Grant, UCR Convert Electricity to Chemicals by Novel Biocatalysts Role: Co-PI	Ge (PI)	07/01/2014-12/31/2014

Robert T. Poe Faculty Development Grant Ai (PI) 02/01/2012-01/31/2013
Genetically Encoded Biosensors for Hydrogen Sulfide
Role: PI

UCR Academic Senate Regents' Faculty Fellowship Ai (PI) 07/01/2012-06/30/2014
Novel Encodable Fluorescent Biosensors for Imaging Cell Redox Homeostasis
Role: PI

Hellman Fellowship Ai (PI) 07/01/2013-06/30/2014
Spatiotemporal Control of Metal Ion Signaling with Engineered Fluorescent Proteins
Role: PI

Training of students and postdoctoral researchers

Current Graduate Students:

- Zhijie Chen (Graduate Student in CHEM Ph.D. Program, since 09/2011; *Sawyer Award for Analytical Chemistry Graduate Students; James Merrill and Adeline Wallace Annual Prize*)
- Suzan Youssef (Graduate Student in CHEM Ph.D. Program, since 09/2011)
- Wei Ren (Graduate Student in CHEM Ph.D. Program, since 09/2012; *Sawyer Award for Analytical Chemistry Graduate Students*)
- Yichong Fan (Graduate Student in ETOX Ph.D. Program, since 09/2012; *UCR Dissertation Year Fellowship*)
- Shen Zhang (Graduate Student in CHEM Ph.D. Program, since 09/2013)
- Tan Truong (Graduate Student in CMDB Ph.D. Program, since 04/2014)
- Andy Yeh (Graduate Student in CHEM Ph.D. Program, since 09/2014)

Current Postdoctoral Researcher:

- Dr. Ao Ji (since 01/2013)
- Dr. Qi Qian (since 01/2016)

Current Undergraduate Students:

- Gabriela Mamani
- Mohit Prajapati
- Merna Makar (2015 Kuwana-Sawyer Award for Undergraduate Researchers)

Former Group Members:

- Dr. Si Chen (Postdoctoral Researcher from 09/2011 to 11/2012)
- Kansas Morgan (2012 Summer Undergraduate RISE Program Researcher)

- Dr. Yunhua Liu, Staff Research Assistant, 2013-2014, currently at Shanghai Agrobiological Gene Center
- Kevin Micko Cheang, Undergraduate Student Researcher from 09/2011 to 06/2012
- Philip Lee, Undergraduate Student Researcher from 09/2012 to 08/2014, received 2014 Kuwana-Sawyer Award for Undergraduate Researchers, currently at UCI
- Quintin Wright, Undergraduate Student Researcher from 09/2011 to 06/2014, currently at the UCSF PharmD program
- Uyen Truong, Undergraduate Student Researcher from 01/2012 to 04/2015
- Jared Yasutake, Undergraduate Student Researcher from 04/2013 to 04/2015
- Gabriela Mamani, Undergraduate Student Researcher from 01/2015 to 07/2015

High School Students:

Liana Amaro-Diaz (summer 2014)

Jolie Carreon (summers 2014, 2015)

Tyler Reagn (summers 2014, 2015)

Michael Wang (summers 2014, 2015)