**ALISON BUTLER**
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**Brief:** Alison Butler joined the Department of Chemistry at UCSB in 1986, following postdoctoral positions at Caltech in Harry Gray's laboratory and at UCLA in Joan Valentine's laboratory. She majored in Chemistry as an undergraduate at Reed College and obtained her PhD at UC San Diego in the Department of Chemistry & Biochemistry with Robert G. Linck and Teddy G. Traylor.

## Education

1977 – BA Reed College (Chemistry)
1982 – PhD UC San Diego (Chemistry)

## Positions

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| 2011- | Distinguished Professor, Department of Chemistry and Biochemistry, UCSB |
| 2010-2015 | Vice Chair, Department of Chemistry and Biochemistry, UCSB |
| 2000-2003 | Associate Dean for Bioengineering at UCSB |
| 1995- 2011 | Professor, Department of Chemistry and Biochemistry, UCSB |
| 1991-1995 | Associate Professor, Department of Chemistry and Biochemistry, UCSB |
| 1986-1991 | Assistant Professor, Department of Chemistry and Biochemistry, UCSB |
| 1984-1985 | Postdoctoral Fellow, Caltech (Advisor: Professor Harry B. Gray) |
| 1982-1984 | Postdoctoral Fellow, UCLA (Advisor: Professor J.S. Valentine) |
| 1977 | UG Summer Intern, DuPont, Central Research & Development: Experimental Station Wilmington, DE (Advisor: C.A. Tolman) |

## Awards and Honors

2019 Fellow Royal Society of Chemistry (FRSC)
2019 Inorganic Reaction Mechanisms Award, Royal Society of Chemistry
2019 Fellow, American Academy of Arts and Sciences
2019 Cope Scholar Award in Organic Chemistry, American Chemical Society
2018 Alfred Bader Award in Bioinorganic or Bioorganic Chemistry, American Chemical Society
Fellow of the American Chemical Society (Class of 2012)
Fellow, American Association for the Advancement of Science (AAAS), 1997
Alfred P. Sloan Foundation Fellow, 1992-1994
34th Harold J. Plous Memorial Award, UCSB, 1991-1992
American Cancer Society Junior Faculty Research Award (JFRA-216), 1988-1991

## *Selected Distinguished & Recent Invited Lectures*

***Cope Scholar Award Lecture,*** ACS Meeting San Diego, August 2019, "Elements of marine bioorganic chemistry: From vanadium to iron"

***Plenary Lecture***, *7th International Symposium on Metallomics*, July 2019, "Siderophores in Stereo: Targeting structural diversity in the discovery of new siderophores"

***Plenary Lecture***, *11th International Symposium on Vanadium, Uruguay,* November 2018, "Biochemical and Biological Impacts of Vanadium Haloperoxidases"

***Plenary Lecture,*** *14th European Biological Inorganic Chemistry Conference (EuroBIC 14), August 2018, "*Targeting structural diversity in the discovery of new siderophores"

***Alfred Bader Award*** *lecture; Plenary session ACS meeting, March 19, 2018, New Orleans, LA,* "Elements of Marine Bioinorganic Chemistry: from Microbes to Mussels"

Invited speaker, 11th International Symposium on Vanadium, "Biochemical and Biological Impacts of Vanadium Haloperoxidases", November 5-8, 2018 Montevideo, Uruguay, (Upcoming)

Keynote Lecture, 18th International Conference on Biological Inorganic Chemistry (ICBIC18), Florianopolis, Brazil, July 31-August 4, 2017.

***Plenary Lecture,*** *6th* Georgian Bay Int'l Conference on Bioinorganic Chemistry (CanBIC5), May 2017

Keynote Lecture, 2017 Adhesion Society Annual Meeting, St. Petersburg, FL, February 26-March 1, 2017

Invited speaker, Metals in Biology Gordon Research Conference, Oxnard, CA, January 22-26, 2017

***Plenary Lecture***, 8th Asian Biological Inorganic Chemistry Conference (AsBIC8), Auckland, New Zealand, December 2016

***Douglas Eveleigh Lecture*** (Sponsored by the Selman Waksman Foundation), Marine Biological Laboratory, Woods Hole, MA July 2016

**The Hans Freeman Lecturer,** University of Sydney, Inorganic Foundation of Australia, University of Sydney, September 2015 (3 lectures and an Oxbridge speech)

Keynote Lecture***,*** 17th International Conference on Biological Inorganic Chemistry (ICBIC17), Nanjing, China, July 20-24, 2015

Keynote Lecture***,*** 7th Asian Biological Inorganic Chemistry Conference (AsBIC7), Nov 30-Dec 5, 2014, Queensland, Australia, "Biosynthesis and Tailoring of Acyl Peptidic Siderophores"

Keynote Lecture***,*** 17th International Conference on Biological Inorganic Chemistry (ICBIC17), Beijing, China, July 20-24, 2015

Keynote Lecture, 12th 11th European Bioinorganic Chemistry Conference (Eurobic12), August 24-28, 2014; "The Chemical Biology of Acylated Enterobactin-like Siderophores in *Vibrio harveyi"*

BioMetals 2014 (International BioMetals Society), July 13-18, 2014 Duke University "Biosynthesis and Chemical Biology of Acylated Siderophores*"*

**Thursday Evening lecture,** Metals in Biology Gordon Research Conference and the Bioinorganic Graduate Research Seminar, January 30-February 4, 2011 (Ventura, CA) "Elements of the High Seas: Bioinorganic Chemistry in the Marine Environment."

**Plenary Lecture,** BIOMETALS 2004, September 2004 Garmisch-Partenkirchen, Germany

**Plenary Lecture,** Int'l Institute of Metals in Biology of Grenoble (IMBG) Sept 2004, Villard-de-Lans, France.

**Plenary Lecture,** 11th Int'l Conference on Bioinorganic Chemistry (ICBIC-11), Cairns, Australia, July 2003.

**NSF Distinguished Lecturer,** December 2002 (Mathematics & Physical Sciences Division)

**Nobel Prize Centennial Celebration Lecture**, 21st Century Pioneers of Science, October 24, 2001, UCLA/Caltech, "Trafficking Iron on the High Seas: An Essential Element of Microbial Life." webcast: http://www.oid.ucla.edu/Webcast/Nobel/index.html/view?searchterm=Nobel begins at 01hr:04 min (Introduction by Nobel Laureate Alan Heeger at 01:02).

**H. Burr Steinbach Fellow** in Marine Chemistry, Woods Hole Oceanographic Institution, M.I.T., 1999-2000

## Professional Activities

### Chair of 3 Gordon Research Conferences

2006, Environmental BioInorganic Chemistry Gordon Research Conference (Vice-Chair 2004; Elected at the Inaugural meeting of the EBIC GRC in 2002)

2004, Metals in Biology Gordon Research Conference, Ventura, CA (Vice-Chair 2003)

2002, Marine Natural Products Gordon Research Conference, Ventura, CA (Vice Chair 2000)

### Society for Biological Inorganic Chemistry (SBIC, an International Society)

2012-2014 – **President** of SBIC (elected position)

2014-2016 – Past President of SBIC

2001-2005 – Council Member of SBIC (elected position)

### American Association for the Advancement of Science (AAAS)

2012-2013 – **Chair,** Section C (Chemistry)

2013-2014 – Past Chair, Section C (Chemistry)

2011-2012 – Chair-elect, Section C (Chemistry)

2008-2011 – Section C (Chemistry) Nominating Committee

American Chemical Society

2002 Chair, Bioinorganic Subdivision, Division of Inorganic Chemistry, ACS 2002 (Chair-elect 2001)
1998-2000, Member, Executive Committee, Division of Inorganic Chemistry of the ACS
1993-1995, Alternate Councilor, Division of Inorganic Chemistry of the ACS
1990, Member, Nominations & Symposium Planning Committee, Division of Inorganic Chemistry, ACS
1982-1990, Member, Younger Chemists Committee of the ACS

**Selected Publications** (Full list on website: https://labs.chem.ucsb.edu/butler/alison/)

Genomic Analysis of Siderophore β-Hydroxylases Reveals Divergent Stereocontrol and Expands the Condensation Domain Family, Z.L. Reitz, C.D. Hardy, J. Suk, J. Bouvet, and Alison Butler, ***Proc. Nat'l Acad. Sci.***, USA, 2019, In Press (9/16/19)

Adaptive synergy between catechol and lysine promotes wet adhesion by surface salt displacement" by G.P. Maier, M.V. Rapp, J. H. Waite, J.N. Israelachvili, and Alison Butler, ***Science,*** 2015, *349,* 628-632. DOI: 10.1126/science.aab0556

Mechanistic Considerations of Halogenating Enzymes, Alison Butler and Moriah Sandy, ***Nature***, 2009, 460, 848-854. (Invited Insights Article) doi: 10.1038/nature08303

Iodide in kelp: an inorganic antioxidant in life impacting atmospheric chemistry, F.C. Küpper, L.J. Carpenter, G.B. McFiggans, C.J. Palmer, T.J. Waite, E.-M. Boneberg, S. Woitsch, M. Weiller, P. Potin, A. Butler, G. W. Luther III, P.M.H. Kroneck, W. Meyer-Klaucke, and M.C. Feiters, ***Proc. Nat'l Acad. Sci****., 2008, 105,* 6954–6958. doi: 10.1073/pnas.0709959105

Structure and Membrane Affinity of a New Suite of Amphiphilic Siderophores Produced by a Marine Bacterium, J.S. Martinez, J.N. Carter-Franklin, E.L. Mann, J.D. Martin, M.G. Haygood and Alison Butler, ***Proc. Nat'l Acad. Sci****., USA*, 2003, 100(7), 3754-3759. doi: 10.1073/pnas.0637444100

Iron acquisition: Straight up and on the rocks?, A. Butler, *Nature Structural Biology*, 2003, 10(4), 240-241.

Photochemical cycling of iron in the surface ocean mediated by microbial iron(III)-binding ligands, K. Barbeau, E.L. Rue, K.W. Bruland and Alison Butler, 2001, ***Nature***, *413*, 409-413. doi: 10.1038/35096545

Competition Among Marine Phytoplankton for Different Chelated Iron Species., D.A. Hutchins, A.E. Witter, Alison Butler, G.W. Luther III, ***Nature***, 1999, *400*, 858-861. DOI: 10.1038/23680

Self-Assembling Amphiphilic Siderophores from Marine Bacteria, J.S. Martinez, G.P. Zhang, P.D. Holt, H.-T. Jung, C.J. Carrano, M.G. Haygood and Alison Butler, ***Science****,* 2000, *287*, 1245-1247. doi: 10.1126/science.287.5456.1245

Acquisition and Utilization of Transition Metal Ions by Marine Organisms, Alison Butler, ***Science*****,** 1998, *281*, 207-210. DOI: 10.1126/science.281.5374.207

**Additional Selected Publications** (2014-2019)

On the ambiguity of NRPS structure predictions: Four bidentate chelating groups in the siderophore pacifibactin. Clifford D. Hardy, Alison Butler, *J. Natural Products,* 2019*, 82*, 990-997, DOI: 10.1021/acs.jnatprod.8b01073

A suite of asymmetric citrate siderophores isolated from a marine *Shewanella* species, J.R. Carmichael, H. Zhou, Alison Butler, *J. Inorg. Biochem.*, 2019, 198, article #110736, In Press

β-hydroxyaspartic acid in siderophores: biosynthesis and reactivity, C.D. Hardy, Alison Butler, *J. Natural Products,* 2018, *82*, 990-997, DOI: 10.1021/acs.jnatprod.8b01073

Amphi-enterobactin commonly produced among *Vibrio campbellii* and *Vibrio harveyi* strains can be taken up by a novel outer membrane protein FapA that also can transport canonical Fe(III)-enterobactin. H. Naka, Z. Reitz, A. Jelowicki, A. Butler, M.G. Haygood, *J. Biol. Inorg. Chem, 2018, 23,* 1009–1022; https://doi.org/10.1007/s00775-018-1601-5
Substrate-based differential expression analysis reveals control of biomass-degrading enzymes in *Pycnoporus cinnabarinus,* J.K. Henske, S.D. Springer, M. O'Malley, Alison Butler, *Biochem. Eng. J.,* 2018*,130,* 83-89 https://doi.org/10.1016/j.bej.2017.11.015

Catechol Oxidation: Considerations in the Design of Wet Adhesive Materials, G.P. Maier, C.M. Bernt, Alison Butler, *Biomaterials Science,* 2018, *6*, 332 – 339*.* DOI: 10.1039/c7bm00884h

Siderophores and Mussel Foot Proteins: The Role of Catechol, Cations, and Metal Coordination in Surface Adhesion, Greg P. Maier and Alison Butler, *J. Biol. Inorg. Chem*., 2017, 22, 739-749. Invited for ASBIC8, DOI: 10.1007/s00775-017-1451-6

Biosynthetic Considerations of Triscatechol Siderophores Framed on Serine and Threonine Macrolactone Scaffolds, Z.L. Reitz, M. Sandy and Alison Butler Metallomics, 2017, **9**, 824-839 DOI: 10.1039/c7mt00111h

Defining the Catechol-Cation Synergy for Enhanced Wet Adhesion to Mineral Surfaces, M. V. Rapp, G. P. Maier, H.A. Dobbs, N. J. Higdon, J. H. Waite,* Alison Butler* and J. N. Israelachvili*, *J. Am. Chem. Soc*., 2016, *138*, 9013–9016. **DOI:** 10.1021/jacs.6b03453

Peroxidative Oxidation of Lignin and a Lignin Model Compound by a Manganese SALEN Derivative, S.D. Springer, J. He, M. Chui, R.D. Little, M. Foston, Alison Butler, ACS *ACS Sustainable Chemistry & Engineering,* 2016, *4* (6), 3212–3219 *DOI 10.1021/acssuschemeng.6b00245*

Microbial Ligand Coordination: Consideration of Biological Significance, S.D. Springer and Alison Butler, *Coordination Chemistry Reviews*, *2016*, 306, *628-635*. Special Issue in Honor of Peter C. Ford. ***DOI*** 10.1016/j.ccr2015.03.013

Magnetic susceptibility of Mn(III) complexes of hydroxamate siderophores, S.D. Springer and Alison Butler, *J. Inorg. Biochem*. *2015, 148, 22-26.* Special issue for EuroBIC14 International Conference **DOI** 10.1016/j.jinorgbio.2015.04.015

Acyl peptidic siderophores: Structures, biosyntheses and post-assembly modifications, M.P. Kem, Alison Butler, *Biometals*, 2015, *28,* 445–459. (Invited for Biometals 2014 International Conference) **DOI** 10.1007/s10534-015-9827-y

Fatty acid hydrolysis of acyl-marinobactin siderophores by Marinobacter acylases, M. Kem, H. Naka, A. Iinishi, M.G. Haygood, Alison Butler, *Biochemistry*, 2015, 54, 744-752. **DOI** 10.1021/bi5013673

Microbial tailoring of acyl peptidic siderophores, J. M. Gauglitz, A. Iinishi, Y. Ito, and Alison Butler, *Biochemistry*, 2014, *53*, 2624-2631 **DOI:** 10.1021/bi500266x

Amphiphilic Siderophore Production by Oil-associating Microbes," by M.P. Kem, H.K. Zane, S.D. Springer, J.M. Gauglitz, and Alison Butler, Metallomics, Metallomics*, 2014, 6, 1150-1155.* (Special themed issue on Metals in Marine Biochemistry) DOI: 10.1039/c4mt00047a

Biosynthesis of Amphi-enterobactin Siderophores by *Vibrio harveyi* BAA-1116: Identification of a Bifunctional NRPS Condensation Domain, H.K. Zane, H. Naka, F. Rosconi, M. Sandy, M. G. Haygood & Alison *Butler, J. Am. Chem. Soc*., 2014, *134*, 5615-5618 **DOI:** 10.1021/ja5019942.

Microbial tailoring of acyl peptidic siderophores, Julia M. Gauglitz, Akira Iinishi, Yusai Ito, and Alison Butler, *Biochemistry*, 2014, *53*, 2624-2631 DOI 10.1021/bi500266x

Amphiphilic Siderophore Production by Oil-associating Microbes," by Michelle P. Kem, H.K. Zane, S. D. Springer, J.M. Gauglitz, and Alison Butler, Metallomics, 2014, *6*, 1150-1155. DOI: 10.1039/cc4mt00047a