



Carolyn Bertozzi

Director, ChEM-H, Anne T. and Robert M. Bass Professor in the School of Humanities and Sciences and Professor, by courtesy, of Radiology and of Chemical and Systems Biology
Chemistry

CONTACT INFORMATION

• Administrative Contact

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Bio

BIO

Professor Carolyn Bertozzi's research interests span the disciplines of chemistry and biology with an emphasis on studies of cell surface sugars important to human health and disease. Her research group profiles changes in cell surface glycosylation associated with cancer, inflammation and bacterial infection, and uses this information to develop new diagnostic and therapeutic approaches, most recently in the area of immuno-oncology.

Dr. Bertozzi completed her undergraduate degree in Chemistry at Harvard University and her Ph.D. at UC Berkeley, focusing on the chemical synthesis of oligosaccharide analogs. During postdoctoral work at UC San Francisco, she studied the activity of endothelial oligosaccharides in promoting cell adhesion at sites of inflammation. She joined the UC Berkeley faculty in 1996. A Howard Hughes Medical Institute Investigator since 2000, she came to Stanford University in June 2015, among the first faculty to join the interdisciplinary institute ChEM-H (Chemistry, Engineering & Medicine for Human Health). Named a MacArthur Fellow in 1999, Dr. Bertozzi has received many awards for her dedication to chemistry, and to training a new generation of scientists fluent in both chemistry and biology. She has been elected to the Institute of Medicine, National Academy of Sciences, and American Academy of Arts and Sciences; and received the Lemelson-MIT Prize, the Heinrich Wieland Prize, and the ACS Award in Pure Chemistry, among many others. Her efforts in undergraduate education have earned the UC Berkeley Distinguished Teaching Award and the Donald Sterling Noyce Prize for Excellence in Undergraduate Teaching.

Today, the Bertozzi Group at Stanford studies the glycobiology underlying diseases such as cancer, inflammatory disorders such as arthritis, and infectious diseases such as tuberculosis. The work has advanced understanding of cell surface oligosaccharides involved in cell recognition and inter-cellular communication.

Dr. Bertozzi's lab also develops new methods to perform controlled chemical reactions within living systems. The group has developed new tools for studying glycans in living systems, and more recently nanotechnologies for probing biological systems. Such "bioorthogonal" chemistries enable manipulation of biomolecules in their living environment.

Several of the technologies developed in the Bertozzi lab have been adapted for commercial use. Actively engaged with several biotechnology start-ups, Dr. Bertozzi founded Redwood Bioscience of Emeryville, California, and has served on the research advisory board of GlaxoSmithKline.

ACADEMIC APPOINTMENTS

- Professor, Chemistry
- Professor (By courtesy), Radiology
- Professor (By courtesy), Chemical and Systems Biology
- Member, Bio-X
- Member, Maternal & Child Health Research Institute (MCHRI)
- Member, Stanford Cancer Institute
- Faculty Fellow, Stanford ChEM-H
- Member, Wu Tsai Neurosciences Institute

ADMINISTRATIVE APPOINTMENTS

- Investigator, Howard Hughes Medical Institute, (2000- present)

HONORS AND AWARDS

- Arthur C. Cope Award, American Chemical Society (2017)
- National Academy of Sciences Award in the Chemical Sciences, National Academy of Sciences (2016)
- Ernest Orlando Lawrence Award, U.S. Department of Energy (2015)
- Heinrich Wieland Prize, Heinrich Wieland Prize (2012)
- Lemelson-MIT Prize, Massachusetts Institute of Technology (2010)
- Ernst Schering Prize, Ernst Schering Research Foundation (2007)
- Distinguished Teaching Award, UC Berkeley College of Chemistry (2001)
- Award in Pure Chemistry, American Chemical Society (2001)
- MacArthur Foundation "Genius" Award, MacArthur Foundation (1999)
- Arthur C. Cope Scholar Award, American Chemical Society (1999)
- Honorary Degree, Freie University Berlin (2014)
- Honorary Doctorate Degree, Duke University (2014)
- Hans Bloemendal Award, Radboud Univ. Nijmegen (2013)
- Honorary Doctorate Degree, Brown University (2012)
- Tetrahedron Young Investigator Award, Executive Board of Editors and the Publisher of Tetrahedron Publications (2011)
- Albert Hofmann Medal, U. Zurich (2009)
- Harrison Howe Award, Rochester Section, American Chemical Society (2009)
- W. H. Nichols Award, New York Section, American Chemical Society (2009)
- Li Ka Shing Women in Science Award, Li Ka Shing Foundation Women in Science Program (2008)
- Roy L. Whistler International Award in Carbohydrate Chemistry, International Carbohydrate Organization (2008)
- Willard Gibbs Medal, Chicago Section, American Chemical Society (2008)
- T.Z. and Irmgard Chu Distinguished Professorship in Chemistry, UC Berkeley (2005-14)
- Havinga Medal, U. Leiden (2005)
- Agnes Fay Morgan Research Award, Iota Sigma Pi (2004)
- Fellow, American Association for the Advancement of Science (2002)
- Irving Sigal Young Investigator Award, Protein Society (2002)

- Donald Sterling Noyce Prize for Excellence in Undergraduate Teaching, UC Berkeley College of Chemistry (2001)
- Department of Chemistry Teaching Award, UC Berkeley (2000)
- Merck Academic Development Program Award, Merck (2000)
- Presidential Early Career Award in Science and Engineering (PECASE), The U.S. White House (2000)
- Camille Dreyfus Teacher-Scholar Award, Camille and Henry Dreyfus Foundation (1999)
- Beckman Young Investigator Award, Arnold and Mabel Beckman Foundation (1998)
- Glaxo Wellcome Scholar, Glaxo Wellcome (1998)
- Prytanean Faculty Award, Prytanean Women's Honor Society, UC Berkeley (1998)
- Research Innovation Award, Research Corporation (1998)
- Young Investigator Award, Office of Naval Research (1998)
- Horace S. Isbell Award in Carbohydrate Chemistry, American Chemical Society (1997)
- New Investigator Award in Pharmacology, Burroughs Wellcome (1997)
- Sloan Research Fellow, Alfred P. Sloan Foundation (1997)
- Pew Scholars Award in the Biomedical Sciences, Pew Charitable Trusts (1996)
- Young Investigator Award, Exxon Education Fund (1996)
- Dreyfus New Faculty Award, Camille and Henry Dreyfus Foundation (1995)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Member, National Academy of Inventors (2013 - present)
- Member, Institute of Medicine (2011 - present)
- Member, German Academy of Sciences Leopoldina (2008 - present)
- Member, National Academy of Sciences (2005 - present)
- Member, American Academy of Arts and Sciences (2003 - present)
- Chair, Scientific Advisory Board, Redwood Bioscience
- Board Member, Board of Scientific Counslors, Broad Institutue
- Board Member, Catalent Biologics Board
- Board Member, Research Advisory Baord, Glaxo Smithkline

PROFESSIONAL EDUCATION

- Postdoc, UC San Francisco , Immunology
- PhD, UC Berkeley , Chemistry (1993)
- AB, Harvard University , Chemistry (1988)

LINKS

- The Bertozzi Group: <http://bertozzigroup.stanford.edu>
- HHMI Investigator Biography: <http://www.hhmi.org/scientists/carolyn-r-bertozzi>
- Q&A with Dr. Bertozzi: <https://chemh.stanford.edu/news/stanford-chemist-explains-excitement-chemistry-students-public>

Teaching

COURSES

2018-19

- Department Colloquium: CHEM 300 (Aut, Win, Spr)
- Organic Chemistry Seminar: CHEM 229 (Aut, Win, Spr)
- Organic Chemistry of Bioactive Molecules: CHEM 35 (Aut)
- Therapeutic Science at the Chemistry - Biology Interface: CHEM 227 (Spr)

2017-18

- Department Colloquium: CHEM 300 (Aut, Win, Spr)
- Organic Chemistry Seminar: CHEM 229 (Aut, Win, Spr)
- Organic Chemistry of Bioactive Molecules: CHEM 35 (Aut)
- Therapeutic Science at the Chemistry - Biology Interface: CHEM 227 (Spr)

2016-17

- Department Colloquium: CHEM 300 (Aut, Win, Spr)
- Exploring Chemical Research at Stanford: CHEM 111 (Win)
- Organic Chemistry Seminar: CHEM 229 (Aut, Win, Spr)
- Therapeutic Science at the Chemistry - Biology Interface: CHEM 227 (Spr)

2015-16

- Department Colloquium: CHEM 300 (Aut, Win, Spr)
- Organic Chemistry Seminar: CHEM 229 (Aut, Win, Spr)
- Therapeutic Science at the Chemistry - Biology Interface: CHEM 227 (Spr)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Kaustabh Basu, Doreen Chan, Carolyn Cohen, Holly Hajare, Shuo Han, Clayton Hardman, Tim Horton, Pin-Joe Ko, Steven Shuken, Payton Weidenbacher

Postdoctoral Faculty Sponsor

Steven Banik, Joe Buonomo, CJ Cambier, Marc Driessen, Ryan Flynn, Ulla Gerling-Driessen, Rishi Kulkarni, Stacy Malaker, Nicholas Riley, Abraham Waldman, Simon Wisnovsky

Doctoral Dissertation Advisor (AC)

Corleone Delaveris, Giovanni Forcina, Melissa Gray, Kayvon Pedram, Benjie Smith

Doctoral Dissertation Co-Advisor (AC)

Michael Hollander

Doctoral (Program)

Giovanni Forcina

Publications

PUBLICATIONS

- **Precision glyocalyx editing as a strategy for cancer immunotherapy.** *Proceedings of the National Academy of Sciences of the United States of America*
Xiao, H., Woods, E. C., Vukojicic, P., Bertozzi, C. R.
2016; 113 (37): 10304-10309
- **Chemically tunable mucin chimeras assembled on living cells** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Kramer, J. R., Onoa, B., Bustamante, C., Bertozzi, C. R.

2015; 112 (41): 12574-12579

- **CalFluors: A Universal Motif for Fluorogenic Azide Probes across the Visible Spectrum** *JOURNAL OF THE AMERICAN CHEMICAL SOCIETY*
Shieh, P., Dien, V. T., Beahm, B. J., Castellano, J. M., Wyss-Coray, T., Bertozzi, C. R.
2015; 137 (22): 7145-7151
- **Isotope-targeted glycoproteomics (IsoTaG): a mass-independent platform for intact N- and O-glycopeptide discovery and analysis** *NATURE METHODS*
Woo, C. M., Iavarone, A. T., Spicciarich, D. R., Palaniappan, K. K., Bertozzi, C. R.
2015; 12 (6): 561-?
- **The cancer glycocalyx mechanically primes integrin-mediated growth and survival** *NATURE*
Paszek, M. J., DuFort, C. C., Rossier, O., Bainer, R., Mouw, J. K., Godula, K., Hudak, J. E., Lakins, J. N., Wijekoon, A. C., Cassereau, L., Rubashkin, M. G., Magbanua, M. J., Thorn, et al
2014; 511 (7509): 319-?
- **Imaging bacterial peptidoglycan with near-infrared fluorogenic azide probes** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Shieh, P., Siegrist, M. S., Cullen, A. J., Bertozzi, C. R.
2014; 111 (15): 5456-5461
- **Glycocalyx engineering reveals a Siglec-based mechanism for NK cell immunoevasion** *NATURE CHEMICAL BIOLOGY*
Hudak, J. E., Canham, S. M., Bertozzi, C. R.
2014; 10 (1): 69-U111
- **Osmosensory signaling in Mycobacterium tuberculosis mediated by a eukaryotic-like Ser/Thr protein kinase** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Hatzios, S. K., Baer, C. E., Rustad, T. R., Siegrist, M. S., Pang, J. M., Ortega, C., Alber, T., Grundner, C., Sherman, D. R., Bertozzi, C. R.
2013; 110 (52): E5069-E5077
- **Imaging the Glycosylation State of Cell Surface Glycoproteins by Two-Photon Fluorescence Lifetime Imaging Microscopy** *ANGEWANDTE CHEMIE-INTERNATIONAL EDITION*
Belardi, B., de la Zerda, A., Spicciarich, D. R., Maund, S. L., Peehl, D. M., Bertozzi, C. R.
2013; 52 (52): 14045-14049
- **D-Amino Acid Chemical Reporters Reveal Peptidoglycan Dynamics of an Intracellular Pathogen** *ACS CHEMICAL BIOLOGY*
Siegrist, M. S., Whiteside, S., Jewett, J. C., Aditham, A., Cava, F., Bertozzi, C. R.
2013; 8 (3): 500-505
- **A Pictet-Spengler ligation for protein chemical modification** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Agarwal, P., van der Weijden, J., Sletten, E. M., Rabuka, D., Bertozzi, C. R.
2013; 110 (1): 46-51
- **Reactivity of Biarylazacyclooctenones in Copper-Free Click Chemistry** *JOURNAL OF THE AMERICAN CHEMICAL SOCIETY*
Gordon, C. G., Mackey, J. L., Jewett, J. C., Sletten, E. M., Houk, K. N., Bertozzi, C. R.
2012; 134 (22): 9199-9208
- **Mapping Yeast N-Glycosites with Isotopically Recoded Glycans** *MOLECULAR & CELLULAR PROTEOMICS*
Breidenbach, M. A., Palaniappan, K. K., Pitcher, A. A., Bertozzi, C. R.
2012; 11 (6)
- **Elucidation and Chemical Modulation of Sulfolipid-1 Biosynthesis in Mycobacterium tuberculosis** *JOURNAL OF BIOLOGICAL CHEMISTRY*
Seeliger, J. C., Holsclaw, C. M., Schelle, M. W., Botyanszki, Z., Gilmore, S. A., Tully, S. E., Niederweis, M., Cravatt, B. F., Leary, J. A., Bertozzi, C. R.
2012; 287 (11): 7990-8000
- **Synthesis of Heterobifunctional Protein Fusions Using Copper-Free Click Chemistry and the Aldehyde Tag** *ANGEWANDTE CHEMIE-INTERNATIONAL EDITION*
Hudak, J. E., Barfield, R. M., de Hart, G. W., Grob, P., Nogales, E., Bertozzi, C. R., Rabuka, D.
2012; 51 (17): 4161-4165
- **A Bioorthogonal Quadricyclane Ligation** *JOURNAL OF THE AMERICAN CHEMICAL SOCIETY*

Sletten, E. M., Bertozzi, C. R.
2011; 133 (44): 17570-17573

- **From Mechanism to Mouse: A Tale of Two Bioorthogonal Reactions** *ACCOUNTS OF CHEMICAL RESEARCH*
Sletten, E. M., Bertozzi, C. R.
2011; 44 (9): 666-676
- **Isotopic Signature Transfer and Mass Pattern Prediction (IsoStamp): An Enabling Technique for Chemically-Directed Proteomics** *ACS CHEMICAL BIOLOGY*
Palaniappan, K. K., Pitcher, A. A., Smart, B. P., Spiciarich, D. R., Iavarone, A. T., Bertozzi, C. R.
2011; 6 (8): 829-836
- **Metabolic cross-talk allows labeling of O-linked beta-N-acetylglucosamine-modified proteins via the N-acetylgalactosamine salvage pathway** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Boyce, M., Carrico, I. S., Ganguli, A. S., Yu, S., Hangauer, M. J., Hubbard, S. C., Kohler, J. J., Bertozzi, C. R.
2011; 108 (8): 3141-3146
- **In vivo imaging of membrane-associated glycans in developing zebrafish** *SCIENCE*
Laughlin, S. T., Baskin, J. M., Amacher, S. L., Bertozzi, C. R.
2008; 320 (5876): 664-667

PRESENTATIONS

- Reddit Science AMA Series (June 19, 2015)
- People Behind the Science (2015)
- iBiology Lecture Series Part 1: Chemical Glycobiology (3/1/2010)
- iBiology Lecture Series Part 2: Imaging the Glycome
- TEDx Stanford Lecture: The sugar coating on your cells is trying to tell you something - TEDx Stanford (June 22, 2016)