

GARY W. BRUDVIG

Professor of Chemistry and Molecular Biophysics & Biochemistry, Yale University

Professional Preparation

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| Univ. of Minnesota, Minneapolis, MN | Chemistry | B.S. (high distinction) | 1976 |
| Caltech, Pasadena, CA | Chemistry | Ph.D. | 1981 |
| Univ. of California, Berkeley, CA | Chemistry | Miller Postdoctoral Fellow | 1980-82 |

Appointments

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| 1991-present | Professor of Chemistry, Yale University |
| 2012-present | Director, Yale Energy Sciences Institute |
| 2011-present | Benjamin Silliman Professor |
| 2008-2011 | Eugene Higgins Professor |
| 2004-present | Joint appointment, Dept. of Molecular Biophysics & Biochem. |
| 2003-2009, 2015-2018 | Chair, Department of Chemistry, Yale University |
| 1987-1991 | Associate Professor of Chemistry, Yale University |
| 1982-1987 | Assistant Professor of Chemistry, Yale University |

Research Areas

Structural and mechanistic studies of photosynthetic water oxidation, natural and artificial photosynthesis, water-oxidation catalysts for solar fuel production, structural and functional modeling of manganese enzymes, application of electron paramagnetic resonance spectroscopy to the study of metalloproteins, biological electron-transfer reactions.

Selected Honors

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| 1975 | Phi Beta Kappa Honor Society |
| 1982 | Camille and Henry Dreyfus Newly Appointed Faculty Fellowship |
| 1983-1986 | Searle Scholar |
| 1985-1990 | Camille and Henry Dreyfus Teacher-Scholar |
| 1986-1988 | Alfred P. Sloan Research Fellow |
| 1995 | Elected Fellow - American Association for the Advancement of Science |
| 1997 | Distinguished Alumni Award - Mounds View High School, Minnesota |
| 2016 | Outstanding Achievement Award - University of Minnesota |
| 2019 | Elected Member - Connecticut Academy of Science and Engineering |
| 2021 | Graduate Mentor Award in the Natural Sciences, Yale University |

Named Lectureships

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| 1998 | R. T. Major Lecture, University of Connecticut |
| 2002 | Watkins Lecture, Wichita State University |
| 2005 | Sunney I. Chan Lecture, Institute of Chemistry, Academia Sinica, Taipei, Taiwan |
| 2008 | Baker Lecture, Cornell University |
| 2012 | Harry C. Allen Lecture, Clark University |
| 2016 | Sunney and Irene Chan Lecture, Hong Kong Polytechnic University |
| 2022 | Tom Wydrzynski Lecture, 18 th International Congress on Photosynthesis |
| 2023 | Clean Energy Distinguished Lecture, Boston College |
| 2024 | Naff Lecture, University of Kentucky McGregory Lecture, Colgate University Iddles Lecture, University of New Hampshire |
| 2025 | O'Keffee Lecture, Arizona State University |

Synergistic Activities

1. Review panels for DOE, NIH and USDA (ad hoc member of >35 panels to date).
2. Editorial Advisory Boards (Artificial Photosynthesis, CRC Press, Biochemistry, Sci, Inorganics, Nanotechnology, Nano Futures, World Scientific Publishers, H1 Connect).
3. Chair, Gordon Research Conference on Biophysical Aspects of Photosynthesis, 2000; Chair, Gordon Research Conference on Solar Fuels, 2018.

4. Associate Editor of Biochemistry, 2000-2016.
5. Outreach: Taught 2 local and 8 national seminars for the Yale-New Haven Teachers Institute leading to the development of 91 teaching units for public school teachers that are published on the Institute's web site (www.yale.edu/ynhti), 2000-present.

Selected Publications (out of 505 total; h=107 and >42,000 citations (Google Scholar))

1. "A Functional Model for O-O Bond Formation by the O₂-Evolving Complex in Photosystem II", Julian Limburg, John S. Vrettos, Louise M. Liable-Sands, Arnold L. Rheingold, Robert H. Crabtree and Gary W. Brudvig (1999) *Science* 283, 1524-1527.
2. "Mechanism of Photosynthetic Water Oxidation: Combining Biophysical Studies of Photosystem II with Inorganic Model Chemistry", John S. Vrettos, Julian Limburg and Gary W. Brudvig (2001) *Biochim. Biophys. Acta* 1503, 229-245.
3. "Molecular Recognition in the Selective Oxygenation of Saturated C—H Bonds by a Dimanganese Catalyst", Siddhartha Das, Christopher D. Incarvito, Robert H. Crabtree and Gary W. Brudvig (2006) *Science* 312, 1941-1943.
4. "Quantum Mechanics/Molecular Mechanics Study of the Catalytic Cycle of Water Splitting in Photosystem II", Eduardo M. Sproviero, José A. Gascón, James P. McEvoy, Gary W. Brudvig and Victor S. Batista (2008) *J. Am. Chem. Soc.* 130, 3428-3442
5. "A Visible Light Water-Splitting Cell with a Photoanode formed by Codeposition of a High-Potential Porphyrin and an Iridium Water-Oxidation Catalyst", Gary F. Moore, James D. Blakemore, Rebecca L. Milot, Jonathan F. Hull, Hee-eun Song, Lawrence Cai, Charles A. Schmuttenmaer, Robert H. Crabtree and Gary W. Brudvig (2011) *Energy & Environ. Science* 4, 2389-2392.
6. "A Molecular Catalyst for Water Oxidation that Binds to Metal Oxide Surfaces", Stafford W. Sheehan, Julianne M. Thomsen, Ulrich Hintermair, Robert H. Crabtree, Gary W. Brudvig and Charles A. Schmuttenmaer (2015) *Nature Comm.* 6, 6469.
7. "Electrocatalytic Water Oxidation by a Copper(II) Complex of an Oxidation-Resistant Ligand", Katherine J. Fisher, Kelly L. Materna, Brandon Q. Mercado, Robert H. Crabtree and Gary W. Brudvig (2017) *ACS Catalysis* 7, 3384-3387.
8. "Optimization of Surface Loading of the Silatrane Anchoring Group on TiO₂", Jennifer L. Troiano, Robert H. Crabtree and Gary W. Brudvig (2022) *ACS Appl. Mater. Interfaces* 14, 6582-6589.
9. "High-resolution Cryo-EM Structure of Photosystem II from the Mesophilic Cyanobacterium, *Synechocystis* sp. PCC 6803", Christopher J. Gisriel, Jimin Wang, Jinchuan Liu, David A. Flesher, Krystle M. Reiss, Hao-Li Huang, Ke R. Yang, William H. Armstrong, M. R. Gunner, Victor S. Batista, Richard J. Debus and Gary W. Brudvig (2022) *Proc. Natl. Acad. Sci. U.S.A.* 119, e2116765118.
10. "Electrocatalytic, Homogeneous Ammonia Oxidation in Water to Nitrate and Nitrite with a Copper Complex", Han-Yu Liu, Hannah M. C. Lant, Jennifer L. Troiano, Gongfang Hu, Brandon Q. Mercado, Robert H. Crabtree and Gary W. Brudvig (2022) *J. Am. Chem. Soc.* 144, 8449-8453.
11. "Selecting Between Ammonia and Water Oxidation: Electrochemical Oxidation of Ammonia in Water by an Organometallic-Inorganic Hybrid Anode", Han-Yu Liu, Josephine A. Jayworth, Robert H. Crabtree and Gary W. Brudvig (2024) *ACS Catalysis* 14, 2842-2846.
12. "BODIPY Chemisorbed on SnO₂ and TiO₂ Surfaces for Photoelectrochemical Applications", Josephine A. Jayworth, Cristina Decavoli, Matt D. Capobianco, Jan Paul Menzel, Spencer R. Adler, Conrad A. Kocoj, Jessica G. Freeze, Robert H. Crabtree, Peijun Guo, Victor S. Batista and Gary W. Brudvig (2024) *ACS Appl. Mater. Interfaces* 16, 14841-14851.
13. "Mutation-Induced Shift of the Photosystem II Active Site Reveals Insight into Conserved Water Channels", David A. Flesher, Jinchuan Liu, Jimin Wang, Christopher J. Gisriel, Ke R. Yang, Victor S. Batista, Richard J. Debus and Gary W. Brudvig (2024) *J. Biol. Chem.* 300, 107475.
14. "Structure of a Biohybrid Photosystem I-Platinum Nanoparticle Solar Fuel Catalyst", Christopher J. Gisriel, Tirupathi Malavath, Tianyin Qiu, Jan Paul Menzel, Victor S. Batista, Gary W. Brudvig and Lisa M. Utschig (2024) *Nature Comm.* 15, 9519.
15. "Photochemical Oxidation of Substrate Water Analogs and Halides by Photosystem II", Jieun Shin, Jean Kanyo, Richard J. Debus and Gary W. Brudvig (2024) *Adv. Energy Mater.* 14, 2401292.