

## KENNETH D. KARLIN

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Honorary Distinguished Professor  
EWha Womans University  
Seoul 120-750, KOREA

**PERSONAL:** Born October 30, 1948, Pasadena, California.

### ACADEMIC CAREER:

2014-present	Chair, Chemistry Department, The Johns Hopkins University.
1999-present	<i>Ira Remsen Professor of Chemistry</i> , The Johns Hopkins University
1990-present	Professor, Department of Chemistry, The Johns Hopkins University
1987-1990	Professor, Department of Chemistry, SUNY at Albany
1983-1987	Associate Professor, Department of Chemistry, SUNY at Albany
1977-1983	Assistant Professor, Department of Chemistry, SUNY at Albany

### EDUCATION - POSTDOCTORAL TRAINING:

Postdoctoral Fellow, Cambridge University, England, 1975-1977  
Ph.D., Columbia University, New York, 1975  
B.S., 1970, (*cum laude*), Stanford University (graduated June, 1970)

### RESEARCH INTERESTS:

Bioinorganic Dioxygen and Oxidative Stress Chemistry, Copper-O<sub>2</sub> chemistry  
Structural/Functional Models for Copper Metalloproteins. Cu(I)/Cu(II) Oxidation-Reduction (Redox) Processes. Metal-Peroxide Chemistry; Oxidation Catalysis.  
Models for Heme-Copper Oxidases. Porphyrin-Iron & Copper Complex O<sub>2</sub>-Reactivity.  
Transition Metal Nitrogen Oxide (NO<sub>x</sub>) Chemistry; Models for Cu or Fe Nitrite, Nitrous Oxide, and Nitric Oxide Reductases. Peroxynitrite heme (iron) and copper chemistry.

### PROFESSIONAL MEMBERSHIPS:

American Chemical Society (ACS), Division of Inorganic Chemistry (DIC)

### AWARDS / DISTINCTIONS:

2014 The 10<sup>th</sup> Sunney Chan Lectureship, Oct. 17, 2014, Academia Sinica, Taipei, Taiwan  
2014 elected Fellow, of the American Chemical Society  
2011 Maryland Chemist of the Year Award (American Chemical Society Maryland Section)  
2009 F. Albert Cotton Award in Synthetic Inorganic Chemistry  
American Chemical Society (ACS) National Award  
2009 ACS Sierra Nevada Distinguished Chemist Award  
– Fellowship, Japan Society for the Promotion of Science (JSPS), March-April, 2004  
supporting a two-week lecture tour/visit to Universities in Japan  
– Appointed to *Ira Remsen Chair in Chemistry*, Johns Hopkins University, May 1999.  
– Elected Chair, 1998 *Metals in Biology* Gordon Research Conference  
– *Distinguished Visitors Lecturer*, Haverford College (PA), 2005.  
– "MERIT" Award, 1993- 2003 , National Institute of General Medical Sciences (NIH).  
– *Karcher Lecturer*, Univ. Oklahoma, 1993.  
– *Fellow*, American Association for the Advancement of Science (AAAS) - elected October, 1992.  
– 1991 Buck-Whitney Award (ACS Eastern New York Section Research Award)  
– University "Excellence in Research" Award, SUNY at Albany, 1988.  
– General Electric Visiting Faculty Research Fellow, GE R&D Center, Schenectady, NY, 1986-87.  
– NATO Postdoctoral Fellow, 1976-1977, Cambridge University, England.  
– G. B. Pegram Distinguished Fellow (1975-76); U. S. Ramsey Fellow (1976-77).  
– Chemistry Honors, Graduate Cum Laude (Stanford U., 1970); NSF Traineeship (1970-72)

**PROFESSIONAL ACTIVITIES (selected):****Publications/Presentations:**

339 Research Papers & 4 Edited Monographs ('74-'15), >300 Abstracts/Posters ('79-'15).

**EDITOR:** *Progress in Inorganic Chemistry* (Wiley-Interscience), 1992-present, Vols. 41-59.

**Society for Biological Inorganic Chemistry (SBIC)**, Treasurer (elected), 1999-2007.

**Society for Biological Inorganic Chemistry (SBIC)**, Program Committee, ICBIC/IOC

**Secretary/Head:** 2001-present. International Organizing Committee for biennial *International Conference on Bioinorganic Chemistry* (ICBIC), Permanent member since '85.

**Guest Editor:** *Accounts of Chemical Research* special issue, "Synthesis in Biological Inorganic Chemistry" with S.J.Lippard & J.S.Valentine. Twenty-six (26) invited articles published, **2015**, [http://pubs.acs.org/page/achre4/synthesis\\_biological\\_inorganic\\_chemistry.html](http://pubs.acs.org/page/achre4/synthesis_biological_inorganic_chemistry.html)

**Journal Editorial/Advisory Boards:** *Chemistry Letters* (Chem. Soc. Japan)('14-'16), (*Inorganic Chemistry Communications* (Elsevier; 2013-2015, *Inorganic Chemistry* ('09 - '11), *J. Biol. Inorg. Chem. (JBIC)* ('07-'10), *Chemistry Letters* (Chem. Soc. Japan)('05-'07), *Accounts of Chemical Research* ('03-'05), *Journal of Inorganic Biochemistry* ('92 - present). *Journal of Biological Inorganic Chemistry* (JBIC) ('96-'99). *Inorganic Chemistry* ('95-'97), *Inorganic Chemistry* ('87-'90).

**PRF-ACS Advisory Board Member, 1998-2001** Petroleum Research Fund (PRF) of the American Chemical Society (ACS)

**American Chemical Society:**

2013– **Chair** (elected) of the ACS Division Inorg Chem. (DIC) Chair-Elect (2012).

2007-2009 – Div.Inorg.Chem. - Executive Committee; Member at Large (elected)

1996 Chairman (elected), Bioinorganic Subdivision, Division of Inorganic Chemistry.

American Chemical Society Awards Committee in Inorganic Chemistry; 1998.

**NIH Study Section:** Review Panel Member, Metallobiochemistry (BMT), 1988-1992.

**Conference Organizer/Chairman:**

*Strategies & Molecular Mechanisms of Contaminant Degradation Chemistry*, Division of Inorg. Chem. Symposium. 230<sup>th</sup> ACS Natl. Mtg., Washington, DC, Aug 28-Sept 1, 2005

Gordon Research Conference on *Metals in Biology*, Ventura, CA. Elected Chair, 1998.

*Copper Coordination Chemistry: Bioinorganic Perspectives*, Johns Hopkins University Symposium, August 3-7, 1992.

*4th Intl. Conf. Bioinorganic Chemistry* (ICBIC-4), Cambridge, MA, July 23-28, 1989.

International Conference, *Inorganic and Biochemical Perspectives in Copper Coordination Chemistry*, SUNY Albany, July 23-27, 1984.

International Conference, *Inorganic and Biochemical Perspectives in Copper Coordination Chemistry*, SUNY Albany, June 1-4, 1982.

**Consultant:** Unilever Research U.S. - Edgewater, N. J., 1993-1997. Unilever Research Laboratories, Vlaardingen, The Netherlands, 1998-2005.

**Books Edited**

- "Copper Coordination Chemistry: Biochemical and Inorganic Perspectives" Karlin, K. D.; Zubieta, J., Eds.; Adenine Press: Guilderland, N.Y., 1983.
- "Biological & Inorganic Copper Chemistry" Karlin, K. D.; Zubieta, J., Eds.; Adenine Press: Guilderland, N.Y., 1986; Vol. 1-2.
- "Bioinorganic Chemistry of Copper" Karlin, K. D., Tyeklár, Z., Eds., Chapman & Hall: New York, 1993.
- "Copper-Oxygen Chemistry", (Eds.: S. Itoh, K. D. Karlin), Wiley-VCH, Hoboken, **2011**, 11 chapters, 462 pages. Wiley Series on Reactive Intermediates in Chemistry and Biology, Vol. 5 (Series Ed.: S. E. Rokita).

***Progress in Inorganic Chemistry***, Karlin, K. D., Editor, John Wiley & Sons: New York, N.Y.

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|---------------------------------------|--|
| Volume 41, 1994 (9 chapters, 848 pp); | Volume 42, 1995 (5 chapters, 606 pp)   |
| Volume 43, 1996 (6 chapters, 621 pp); | Volume 44, 1996 (7 chapters, 421 pp)   |
| Volume 45, 1997 (6 chapters, 510 pp); | Volume 46, 1997 (4 chapters, 488 pp)   |
| Volume 47, 1998 (8 chapters, 978 pp); | Volume 48, 1999 (6 chapters, 603 pp)   |
| Volume 49, 2001 (6 chapters, 700 pp); | Volume 50, 2001 (8 chapters, 631 pp)   |
| Volume 51, 2003 (5 chapters, 640 pp); | Volume 52, 2004 (11 chapters, 738 pp)  |
| Volume 53, 2005 (2 chapters, 602 pp); | Volume 54, 2005, (7 chapters, 535 pp)  |
| Volume 55, 2007 (9 chapters, 759 pp); | Volume 56, 2009, (6 chapters, 568 pp); |
| Volume 57, 2011 (9 chapters, 615 pp); | Volume 58, 2014 (6 chapters, 518 pp);  |
| Volume 59, 2014 (7 chapters, 583 pp); |  |

**INVITED SYMPOSIUM SPEAKER (1990 to present):**

- 2015 *International Chemical Congress of Pacific Basin Societies*, December 15-20, 2015, Honolulu, Hawaii. "Nitrogen Oxide Chemistry with Heme-Copper and Copper Complexes: Bioinorganic Aspects" Symposium #371 *The Bio-Coordination Chemistry of Nitric Oxide and its Derivatives: Mechanisms of NO<sub>x</sub> Generation, Signaling and Reduction in Biological Systems*. Invited Symposium Speaker.
- 2015 *International Chemical Congress of Pacific Basin Societies*, December 15-20, 2015, Honolulu, Hawaii. "Primary Copper-Dioxygen Adducts: New Platforms, Substrate Reactivity and Reduction" Symposium #339 *Dioxygen Activation Chemistry of Metalloenzymes & Models*. Invited Symposium Speaker.
- 2015 *International Chemical Congress of Pacific Basin Societies*, December 15-20, 2015, Honolulu, Hawaii. "New Synthetic Approaches to Heme-O<sub>2</sub>-Cu Assemblies and Insights into the O-O Reductive Cleavage Using Proton-Electron Sources" Symposium #268 *Frontiers in Iron Chemistry in Biology*. Invited Symposium Speaker.
- 14<sup>th</sup> *International Union of Materials Research Societies – International Conference on Advanced Materials (IUMRS-ICAM 2015)*. October 25-29, 2015. ICC Jeju, Jeju Island, Korea, "Dioxygen Activation and New Cupric-Superoxo Complexes", Invited symposium speaker.
- 17<sup>th</sup> *International Symposium on Bioinorganic Chemistry (ICBIC-17)*, July 20-24, 2015, Beijing, China, "New Heme-Cu Dioxygen Constructs and Factors Leading to O-O Reductive

- Cleavage” (announced) --> “Invited Redox Interplay between Nitrite and Nitric Oxide Interposed by a Heme/Cu Assembly” (lecture delivered). Invited Lecturer.
- International Symposium on Perspectives in Electron-Transfer Chemistry*, in honor of the retirement of Shunichi Fukuzumi (Osaka University). April 29<sup>th</sup>, 2015, Osaka Japan. “New Classes of Mononuclear Cupric-Superoxo Complexes”, Invited symposium speaker.
- 249<sup>th</sup> *American Chemical Society (ACS) National Meeting*, March 22-26, 2015, Denver, CO, USA. ACS Division of Inorganic Chemistry symposium in honor of John T. Groves, 2015 ACS National Award in Inorganic Chemistry, “Formation and reactivity of primary copper(I)-dioxygen adducts”, Invited Symposium Lecturer.
- The 10<sup>th</sup> Sunney Chan Lectureship*, Oct. 17, 2014, Academia Sinica, Taipei, Taiwan
- 248<sup>th</sup> *American Chemical Society (ACS) National Meeting*, August 9-14, 2014, San Francisco, CA, USA. ACS Division of Inorganic Chemistry symposium on *Metal Ion Interactions with Nitric Oxide and Reactive Nitrogen Species in Chemistry and Biology: Synthetic models for biological interplay between metal ions and NO<sub>x</sub> species*. "Peroxynitrite (O=NOO<sup>-</sup>) Generation at Metal Complex Centers via (Ligand)-M / NO / O<sub>2</sub> Reactivity". Invited Symposium Lecturer.
- 248<sup>th</sup> *American Chemical Society (ACS) National Meeting*, August 9-14, 2014, San Francisco, CA, USA. ACS Division of Inorganic Chemistry symposium on *Hydrogen Peroxide and Dioxygen in Transition Metal Mediated C-H Functionalization Chemistry* "Ligand effects on the formation, structure and reactivity of primary copper-dioxygen adducts". Invited Symposium Lecturer.
- Bioinorganic Headwaters at the University of Minnesota Conference, Aug. 1, 2014, Minneapolis, MN, USA "The TMPA (TPA) Ligand in Copper Synthetic Bioinorganic Chemistry", Invited Lecture
- 8<sup>th</sup> *International Conference on Porphyrins & Phthalocyanines (ICPP-7)*, June 22-17, 2014, Istanbul, Turkey. “Redox Interplay between Nitrite and Nitric Oxide Interposed by a Heme/Cu Assembly”. Invited Mini-symposium lecturer.
- Penn State Univ. Summer Symposium; Biochemistry & Molecular Biology, "Frontiers in Metallobiochemistry III", June 4-7, 2014. "Copper Dioxygen Coordination Chemistry in Relationship to Copper Proteins", Invited speaker.
- MARC (Maximizing Access to Research Careers) Program, New Mexico State University. Invited Visiting Mentor/Lecturer. April 1, 2014. NMSU Las Cruces, NM, "Copper and Heme-Copper Complex O<sub>2</sub>-Reactivity: Bioinorganic Aspects
- ZING Conferences, Coordination Chemistry Conference 2013, December 5-9, 2013. Occidental Grand Xcaret, (Cancun) MEXICO, "Primary Copper Dioxygen Complex Structure and Reactivity Studies". Invited Plenary Lecturer.
- 246<sup>th</sup> *American Chemical Society (ACS) National Meeting*, Sept. 8-12, 2013. Indianapolis, IN, USA. ACS Division of Inorganic Chemistry symposium, Alfred Werner: Coordination Chemistry a Century after the Nobel Prize, "*Copper(II)-Superoxide Complexes: Structure Substrate Oxidations and Reduction-Protonation Chemistry*". Invited Symposium Lecturer.
- International Symposium on Bioinorganic Chemistry*, Ewha Womans University, Seoul, KOREA, June 13, 2013. Invited Lecturer
- 2013 Gordon Research Conference on Inorganic Reaction Mechanisms, Galveston TX, March 3-8, 2013. Invited Lecturer.

- ADHOC-2012, International Symposium on Activation of Dioxygen & Homogeneous Catalytic Oxidation – September 2-7, 2012, Jerusalem, ISRAEL, "Copper-Dioxygen Adduct Formation, Reactivity and O<sub>2</sub>-Reduction" , Plenary Lecture.
- 244<sup>th</sup> American Chemical Society (ACS) National Meeting, Aug. 19-23, 2012, Philadelphia, PA, USA. Memorial Symposium for Michelle Millar: *Exploration of Enzyme and their Functions Using Synthetic Inorganic Chemistry*. "New heme dioxygen and nitrogen monoxide chemistry". Invited Symposium Lecturer.
- 7<sup>th</sup> International Conference on Porphyrins & Phthalocyanines (ICPP-7), Jeju, Jeju Island, Korea, July 1-6, 2012. "Copper & Heme-Copper O<sub>2</sub> and •NO Adducts and Chemistry: *Bioinorganic Aspects*." Invited Mini-symposium lecturer.
- 2<sup>nd</sup> International Bioinorganic Chemistry Conference on Small Molecule Activation by Heme and Nonheme Enzymes and Models. EWHA Womans University, Seoul, Korea, June 30, 2012, "New Superoxo, Peroxo and Hydroperoxo Dicopper Chemistry Employing Old Binucleating Ligands". Invited Lecture.
- 243<sup>th</sup> American Chemical Society (ACS) National Meeting, March 26-29, 2012, San Diego, CA, USA. *Sessions on Geometric and Electronic Structure Contributions to Reactivity, New reactions of primary copper-dioxygen adducts*". Invited Speaker.
- The 11<sup>th</sup> Global COE International Symposium: Bio-Environmental Chemistry, Osaka University, Osaka, JAPAN, December 19-21, 2011. "Heme-Copper O<sub>2</sub> and •NO Adducts & Chemistry: *Bioinorganic Aspects*". Invited Lecturer.
- 3<sup>rd</sup> SFB 583 Erlangen Symposium on Redox Active Metal Complexes: Control of Reactivity via Molecular Architecture, University of Erlangen, Erlangen GERMANY, October 5-8, 2011. "Heme-Copper O<sub>2</sub> and NO Adducts and Chemistry: *Bioinorganic Aspects*" Invited Lecturer.
- UNIST Workshop, Ulsan National Institute of Science & Technology, Ulsan, Korea, "Heme-Copper O<sub>2</sub> and NO Adducts and Chemistry: *Bioinorganic Aspects*", September 27, 2011. Invited speaker.
- 15<sup>th</sup> International Symposium on Bioinorganic Chemistry (ICBIC-15), Vancouver, British Columbia, Canada, August 7-12, 2011. Invited Lecturer.
- Global Center of Excellence (COE) Program, Kyushu University "Science for Future Molecular Systems." Institute for materials Chemistry and Engineering, Kyushu University, Fukuoka, JAPAN. *The 18<sup>th</sup> Special Lecture by Distinguished Foreign Researcher*. Invited Lectures (3 Lectures), January 27,28, 2011.
- The 1<sup>st</sup> International Conference on MEXT Project of Integrated Research on Chemical Synthesis*, "Advanced Chemical Methodology for Creating Materials" January 24-25, 2011, Catalysis Research Center, Hokkaido U., Sapporo, JAPAN. "Copper-Dioxygen & Cupric-Hydroperoxo Complex Formation, Properties and Reactivity. Invited Plenary Lecturer.
- PACIFICHEM 2010, International Chemical Congress of Pacific Basin Societies, Honolulu, Hawaii, Dec. 15-20, 2010, *Dioxygen Activation Chemistry and Catalytic Oxidation Reactions (# 108)*, "Copper and heme-copper dioxygen reactivity." Inorg. Chem. Division, INOR 910.
- The 4<sup>th</sup> ChemComm International Symposium* in Seoul, October 1-2, 2010, Ewha Womans University, Seoul KOREA. Invited Lecturer.
- 60<sup>th</sup> Anniversary Conference on Coordination Chemistry, Sept. 27-30, 2010, Osaka Japan. Special Tutorial Session, "Ligand Design in Copper-Dioxygen Synthetic Bioinorganic

- Chemistry”. Invited Lecturer
- 240<sup>th</sup> *ACS National Meeting, August 22-26, 2010, Boston, MA. Inorganic Chemistry Division. Ligand Design and Metal Behavior Symposium, “Evolution from TMPA (= TPA) in copper-dioxygen and heme-copper-dioxygen coordination chemistry,”* Invited Lecturer, INOR 423.
- 240<sup>th</sup> *ACS National Meeting, August 22-26, 2010, Boston, MA. Divsn. of Inorganic Chemistry. Bioinorganic Chemistry Session, “Judicious placement of a methylene or methyl group on a ligand for copper: Subsequent copper complex redox behavior or dioxygen chemistry”*, Invited Lecturer, INOR 380.
- 240<sup>th</sup> *ACS National Meeting, August 22-26, 2010, Boston, MA. Division of Physical Chemistry. Symposium on “Metals in Biology”, “Heme-copper dioxygen reactivity to heme-copper oxidases.”* Invited Lecturer, PHYS 115.
- Global Center of Excellence (COE) Program, Dept. Material and Life Science, Osaka University, Osaka, JAPAN. Invited Lectures, July 14-15, 2010. Osaka University, Osaka Japan.
- 105<sup>th</sup> *Korean Chemical Society (KCS) National Meeting, April 29-30, 2010; Songdo Convensia, Incheon, KOREA*
- 239<sup>th</sup> *ACS National Meeting, March 21-25, 2010, San Francisco, CA. Division of Inorganic Chemistry (DIC). Symposium in Honor Stephen J. Lippard, “Ronald Breslow Award for Achievement in Biomimetic Chemistry”*, Invited Symposium Lecturer, INOR 611.
- 239<sup>th</sup> *ACS National Meeting, March 21-25, 2010, San Francisco, CA. Division of Inorganic Chemistry (DIC). Symposium in Honor of Joan S. Valentine, “Alfred Bader Award in Bioinorganic or Bioorganic Chemistry”*, Invited Symposium Lecturer, INOR 527.
- 2010 Gordon Research Conference on *Metals in Biology*, Ventura, CA, Jan. 31 to Feb. 5, 2010. Featured Speaker: 40 min rather than 30 min lecture; lead-off (1<sup>st</sup>) Conference lecture.
- 1<sup>st</sup> *International Symposium on Emergence of Highly Elaborated  $\pi$ -Space and Its Function.* Hotel Hankyu Expo Park, Osaka, JAPAN, December 18-19, 2009.
- Ewha-Yonsei 1<sup>st</sup> International Symposium on Functional Materials.* Ewha Womans University, Seoul, Korea, November 16, 2009.
- Minisymposium on Bioinorganic Chemistry,* Department of Chemistry, Indian Institute of Technology (IIT), Kanpur, Kanpur, INDIA, Nov. 9, 2009.
- Fourth Symposium on Advances in Biological Inorganic Chemistry (SABIC-2009), Mumbai, INDIA, November 4-7, 2009. Plenary Lecture.*
- Sierra Nevada American Chemical Society Local Section; *ACS Sierra Nevada Distinguished Chemist Award.* Award Lecture, October 20, 2009. University of Nevada, Reno
- “International Workshop on Mechanisms of Metalloprotein Functions”*, Hyogo, Japan, July 31-Aug. 1, 2009, **Plenary Lecturer**
- 14<sup>th</sup> *International Symposium on Bioinorganic Chemistry (ICBIC-14), Nagoya, Japan, July 25-30, 2009. Invited Lecturer, Small Molecules (Oxygen) Activation, Session Lecturer*
- 237<sup>th</sup> *ACS National Meeting, March 22-26, 2009, Salt Lake City, Utah. Division of Inorganic Chemistry (DIC). ACS Awards to Inorganic Chemists, F. Albert Cotton Award in Inorganic Synthesis.*
- 237<sup>th</sup> *ACS National Meeting, March 22-26, 2009, Salt Lake City, Utah. Division of Inorganic Chemistry (DIC). Symposium on “Coordination Chemistry of NO and its Implications for Metabolism, Imaging, and Toxicity”.* Symposium Lecturer.

- 4th Asian Biological Inorganic Chemistry Conference (AsBIC-4)*, Jeju, KOREA, November 10-13, 2008. Keynote Lecturer
- 2008 Gordon Research Conference on Inorganic Chemistry*, Salve Regina, Newport, RI, July 13-18.
- 235<sup>th</sup> ACS National Meeting, April 6-10, 2008, New Orleans, LA*, Division of Inorganic Chemistry (DIC). American Chemical Society Alfred Bader Award in Bioinorganic-Bioorganic Chemistry. Symposium for Lawrence Que Jr.; INOR 479.
- Osaka University Global COE International Conference on Advanced Science and Biotechnology 2008*, March 22-23, 2008, Osaka, JAPAN. **Plenary Lecturer.**
- Global COE in Chemistry, Nagoya Special Symposium, "Dioxygen Activation by Metalloenzymes and Models," Nagoya, JAPAN, March 19-21, 2008. Session Lecturer.
- 12<sup>th</sup> Symposium on Modern Trends in Inorganic Chemistry (MTC-XII)*. December 6-8, 2007, IIT Madras, Chennai, INDIA, Plenary Lecturer.
- 13<sup>th</sup> International Symposium on Bioinorganic Chemistry (ICBIC-13)*, Vienna, AUSTRIA, July 15-20, 2007. Keynote Lecturer.
- 30<sup>th</sup> Annual Meeting of the SOCIEDADE BRASILEIRA DE QUIMICA* (Brazil Chemical Society), May 31- June 3, 2007, Águas de Lindóia, state of São Paulo, BRAZIL. Plenary Lecture
- Rollinson Symposium*, Univ. Maryland (College Park), May 1, 2007.
- The Third Asian Biological Inorganic Chemistry Conference (AsBIC-III)*, October 30 – November 3, Nanjing, CHINA. Plenary Lecturer
- International Symposium on Bioinorganic Chemistry of the New Age*, October 26-27, 2006, Kansai University, Suita, JAPAN, Invited Symposium Lecturer.
- 4th International Conference on Porphyrins & Phthalocyanines (ICPP-4)*, Rome, Italy, July 2-7, 2006. Invited Mini-symposium lecturer.
- 231<sup>st</sup> ACS National Meeting*, March 26-30, 2006, Atlanta, GA, INOR 393. Physical Methods in Bioinorganic/Inorganic Chemistry: Awards Symposium for Edward I. Solomon, Invited Symposium Lecturer.
- PACIFICHEM 2005, International Chemical Congress of Pacific Basin Societies, Honolulu, Hawaii, Dec. 15-20, 2005, Symposium on Dioxygen Activation of Metalloenzymes and Models (#162), Inorganic Chemistry Division, INOR 710. Session Lecturer.
- 12<sup>th</sup> International Symposium on Bioinorganic Chemistry (ICBIC-12)*, Ann Arbor, MI, USA, July 31-August 5, 2005. Session Lecturer.
- Symposium in honor of A.D. Zuberbühler and T.Kaden, U. Basel, Switzerland, February 26, '05.
- Gordon Research Conference on Metals in Biology*, Ventura, CA, January 23-27, 2005.
- 34<sup>th</sup> Inorganic Reaction Mechanisms Group (IRMG-34)*, Univ. Liverpool, Liverpool, UK, Jan. 5-7-2005.
- 7<sup>th</sup> European Bioinorganic Conference (EUROBIC-7)*, Garmisch-Partenkirchen, Germany, Aug. 29-Sept. 2, 2004
- 3<sup>rd</sup> International Conference on Porphyrins & Phthalocyanines (ICPP-3)*, New Orleans, LA, USA, July 11-16, 2004
- Benjamin Franklin Medal Symposium, honoring Harry B. Gray (Cal Tech), "The Inorganic Chemistry of Life", April 29, 2004, University of Delaware, Newark, Delaware.

- National Meeting of the Chemical Society of Japan (CSJ), March 27, 2004, Kwansai Gakuin Univ., Nishinomiya, JAPAN
- Mesilla Workshop, The Chemistry of NO In Biological Signaling, Mesilla, New Mexico, February 1-4, 2004.
- International Symposium on Active Oxygen-Metal Complexes - ISAOC 2004, Awaji Island, JAPAN, January 6-9, 2004 .
- Taiwan Bioinorganic Chemistry Symp. (in/honor of Sunney Chan)*, Oct 2-4, 2003, Taipei, Taiwan.
- SFB Guest Professor/Lecturer*, U. Heidelberg, Germany, Sept. 25-30, 2003 (2 lectures delivered).
- International Symposium on Copper in Biology*, U. Konstanz,, Germany, Sept. 21-24, 2003.
- First Asian Meeting of Bioinorganic Chemistry (ASBIC-1)*, Okazaki, JAPAN, March 7-10, 2003
- Gordon Conference on Inorganic Reaction Mechanisms, Ventura, CA, February 16-20, 2003.
- 3<sup>rd</sup> International Meeting on Copper Homeostasis and its Disorder: Molecular and Cellular Aspects, Ischia Porto, Italy, October 4-8, 2002. Session Lecturer.
- Tenth International Conference on Bioinorganic Chemistry (ICBIC-10)*, Florence, Italy, August 26-31, 2001. Session Lecturer.
- Symposium Honoring the Scientific Achievements of Gerald T. Babcock: Physical Approaches to Biochemical Problems*. Michigan State Univ., June 1-2, 2001.
- Edward I. Solomon ACS National Award Symposium*, ACS National Meeting (Inorganic Division), San Diego, CA, April 1-5, 2001, INOR 14.
- Symposium on Oxygen Activation by Metalloproteins and Their Models*, Pacifichem 2000 (ACS Pacific Basins Mtg.) , Dec. 14-19, 2000, Honolulu, Hawaii.
- Lippard 2000 Symposium* (Honoring the 60<sup>th</sup> Birthday of MIT Professor Stephen J. Lippard): "Inorganic Chemistry at the Beginning of the New Millennium", Massachusetts Institute of Technology (MIT), Cambridge, MA, Oct. 6-8, 2000.
- Inorganic Biochemistry Summer Workshop (IBSW2000)*, U. Georgia, July 29 - August 9, 2000. Lecture on Bioinorganic Synthetic Modeling.
- Symposium on Dioxygen Activation, Mid-Atlantic Regional Meeting (MARM)* of the ACS (Inorganic Division), Newark, Delaware, May 15-17, 2000.
- Symposium on Bioinspired Catalysis and Functional Modeling*, ACS National Meeting (Inorganic Division), New Orleans, LA, Aug. 22-26, 1999, INOR 278.
- Eighth International Conference on Bioinorganic Chemistry (ICBIC-8)*, Yokohama, Japan, July 27-Aug. 1, 1997. **Plenary Lecturer**
- Pre-ICBIC-8 Okazaki Symposium*, Okazaki, Japan, July 25-26, 1997.
- Metals in Biology Gordon Research Conference*, Ventura, CA, Jan 19-24, 1997.
- Bioinorganic Mini-Symposium, New York Academy of Sciences, Nov. 14, 1996.
- Copper in Biology Symposium (Biol. Div.)*, ACS National Meeting, Orlando, FL, August 25-29, 1996, BIOL 108.
- 3rd European Conference on Bioinorganic Chemistry (EUROBIC-3)*, Noordwijkerhout, Holland, Aug. 4-10, 1996.
- Conf. on Oxygen Intermediates in Nonheme Metallobiochemistry*. U. Minn., June 23-27, 1996.
- International Meeting on Copper in Biological Systems*, Santa Severa, Italy, Sept. 10-15, 1995.



*Symposium on The Role of Ligands in Metallobiochemistry*, ACS National Meeting, Washington, D.C., Aug. 21-25, 1994.

*30th International Conference on Coordination Chem. (ICCC)*, July 24-29, 1994, Kyoto, Japan.

*Nagoya International Symposium, Structure & Functions of Metal Complexes in Biological Processes*, Nagoya, Japan, July 22-23, 1994.

*Structure and Function of Terminal Oxidases, Symposium & Workshop*, May 30-June 3, 1994, Rome and Rieti, Italy.

*22nd Peter A. Leermakers Symposium, Frontiers & Foundations of Bioinorganic Chemistry*, May 5, 1994, Wesleyen University.

*6th International Conference on Bioinorganic Chemistry (ICBIC)*, La Jolla, California, USA, August 22-27, 1993.

*18th Intl. Symp. on Macrocyclic Chem. (ISMC-18)*, June 27-July 2, 1993, Enschede, Holland, **Plenary Lecturer.**

*Symp. on Mechanistic Bioinorganic Chemistry*, ACS Natl. Meeting, Denver, CO, April 1993.

*5th Intl. Symp. Activation of O<sub>2</sub> & Homogeneous Catalytic Oxidation*, Texas A&M Univ., March 14-19, 1993.

*Gordon Conference, Metal Ions in Biology*, Ventura, CA, January, 1993.

*Johns Hopkins U. Symposium, Copper Coordination Chemistry: Bioinorganic Perspectives*, August 3-7, 1992.

*Fifth International Conf. on Bioinorganic Chem. (ICBIC-5)*, Oxford, England, Aug. 4-10, 1991.

*1991 Inorganic Biochemistry Summer Workshop*, U. Georgia, Athens, GA, June 23-July 3.

*1990 Manzianna Copper in Biology Meeting*, Sept. 23-28, Manzianna, Italy.

*4th Intl. Symposium. Activation of O<sub>2</sub> & Homogeneous Catalytic Oxidation*, Hungary, Sept. 10-14, 1990, **Plenary Lecturer.**

*Gordon Conference, Metal Ions in Biology*, Ventura, CA, January, 1990

#### **INVITED UNIVERSITY AND COMPANY LECTURES (1990 to present):**

2015: Duke University (Durham, NC); U. North Carolina (Chapel Hill); North Carolina State U. (NCSU); Ibaraki Univ., Mito, Ibaraki, Kanto, Japan; UNIST, Ulsan, Korea; Univ. Girona, Girona, Catalonia, Spain.

2014: EWHA Womans University (Seoul, Korea), Harvard-MIT (Inorg. Symp.), New Mexico St. U. (Chemistry), New Mexico St. U (MARC Program), Lebanon Valley College (PA); State University of New York (SUNY) at Albany; National Taiwan Normal University (NTNU), Taipei City, Taiwan; National Tsing Hua University, Hsinchu City, Taiwan; EWHA Womans University (Seoul, Korea); Centro de Investigación y de Estudios Avanzado (Cinvestav), Mexico City; Universidad Nacional Autonoma d MEXICO (UNAM), Mexico City.

2013: Temple Univ. (Philadelphia), Osaka University (Japan March19), Korea Advanced Institute of Science (KAIST); Iowa State U.; Stanford University, University of Florida.

2012: Maryland Section, ACS, Towson; Univ. Pittsburgh (Vascular Medicine Institute)

2011: Kyushu University, Fukuoka, Japan, Cal Tech (Pasadena, CA), Max-Plank Institute (MPI) Mulheim (Germany), University of Giessen (Germany)

2010: Ewha Womans University (Seoul, South Korea); Chonbuk Natl. Univ. (Jeonju, South Korea), U. Texas San Antonio (UTSA)

- 2009: Wayne St. Univ (Detroit), Univ. Michigan (Ann Arbor); Univ. Basel, Switzerland; Univ. Washington, Seattle; University Nevada, Reno; IIT-Kanpur, INDIA;
- 2008: U. Arizona, U. New Mexico. Carnegie-Mellon U., Notre Dame U., New York U.: U. Pennsylvania, U. Illinois.
- 2007: Univ. Maryland, College Park; Univ. Federal de Santa Catarina (UFSC), Florianópolis, BRAZIL; Univ. de São Paulo (USP), São Paulo, BRAZIL; Tata Institute for Fundamental Research (TIFR), Mumbai, INDIA; IISc. Bangalore, Bangalore, INDIA.
- 2006: U. Wisconsin, Madison; Marquette U., U. Md. Baltimore County (UMBC), Gettysburg College (PA).
- 2005: Unilever Research Labs (Port Sunlight, England), Loughborough U. (England), U. Basel (Switzerland), ETH Inorg. Inst. (Zurich, Switzerland), Texas A&M U., Distinguished Visitors Lecturer, Haverford Collg (PA), Boston U., Hampden-Sydney College (VA), Salisbury U. (MD).
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- 2001: Penn. St. U., Juniata College (PA), U. Cincinnati, U. Kentucky, Columbia U. (NYC), Purdue U., Indiana U., Texas A&M U., Towson U. (MD), Shippensburg Univ. (PA).
- 2000: U. California, Irvine, Calif. Inst.Technology, Boston University, Boston College, West Chester U., Swarthmore College, New College (Sarasota, FL)
- 1999: U. Delaware, Unilever Corp. (Port Sunlight, England), Massachusetts Institute Technology (M.I.T.), Natl. Inst. Health (NIH) Bethesda, Unilever Res. Labs (Vlaardingen, The Netherlands), C.N.R.S & Univ. Grenoble (Grenoble, France), U. Maryland (College Park), Johns Hopkins School of Medicine (Pharmacology).
- 1998: Bryn Mawr College, Oregon Graduate Institute (Portland, OR), U. Washington (Seattle), AnorMED Inc. (Langley, B.C.), Univ. Nijmegen (The Netherlands), Clark Univ., Brown Univ.
- 1997: Virginia Commonwealth U., Unilever Res. Labs (New Jersey), U. Rochester.
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- 1994: U. Louisville, Seton Hall U., U. Utah, Utah State U., U. Basel, Switzerland, U. Notre Dame, Mass. Inst. Tech. (M.I.T.), Boston College, Brown U.
- 1993: Columbia U., Howard U., U. Nijmegen (Holland), Johnson-Matthey, Johns Hopkins U./School of Hygiene & Public Health/Dept. Biochemistry, U. Oklahoma (Karcher lecturer), Kansas Univ., Unilever Research Laboratories.
- 1992: U. Pennsylvania, U. Toronto, McMaster U., U. Maryland, U. Maryland (Baltimore County)

- 1991: Pennsylvania St. U., Gettysburg College, Rice U., U. Texas (Austin), Indiana U., U. Colorado, Colorado St. U., Minnesota, Iowa St. U., New York U.
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