

**Gerard Charles Dismukes**

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**2010-2015 Faculty Achievement Report (6 years), Rutgers University:**

Laboratories: Department of Chemistry & Chemical Biology and the Waksman Institute.

Affiliations: The Institute for Advanced Materials and Device Nanotechnology, the Rutgers Energy Institute, and the Department of Microbiology & Biochemistry.

Unless otherwise stated, the information herein refers to the 6 yr period from Jan 2010 through Dec 2015.

The Dismukes laboratory arrived at Rutgers in October 2009, together with 6 graduate students and 1 senior research fellow. He was hired to help build the research profile and initiate partnerships with Rutgers faculty in energy sciences. Since 2010, together with his students and collaborators, he has: co-authored 48 publications, 9 with Rutgers faculty; written and submitted 9 external proposals, 7 with Rutgers faculty members, including large multi-investigator applications (DOE-Solar Fuels HUB was ranked in the top four nationally; 2 NSF-MRSEC IRGs; GCEP). Three joint Rutgers coPI grants have been funded, and 5 individual PI grants were funded. He has raised \$5,255,462 in public and private support since 2010, plus 2 proposals are pending. He has written 4 Rutgers provisional patent applications, 1 patent has issued, 3 are pending, and one was licensed (NATCO); The Rutgers-patented spinel OER catalyst was the subject of a successful phase 1 DOE SBIR proposal and has spawned a phase 2 DOE SBIR application.

**Class Instruction.** Dismukes' statement: "The foremost position that I hold at Rutgers is that of instructor and mentor. I personally believe in the power of inspired teaching to motivate individuals to find purpose and fulfillment from within their own creative minds. I am committed to training the next generation of scientists and citizens to use quantitative reasoning to solve problems and make good decisions."

Dismukes' teaching assignment is based on the research intensive track. He teaches the equivalent of two-half courses per AY, plus assorted guest lectures. In spring 2015 he taught an additional undergraduate half-course. His courses feature rigorous problem solving at both pre- and post-graduate levels. In two graduate courses he developed teaching modules for the peer review process, and both oral and written defense of a research proposal, when neither existed before.

**Mentoring.** Dismukes' training program provides a rich research mentoring experience that engages students in collaborative research projects. Undergraduate students work with an experienced senior lab mentor (graduate student or postdoc), using cutting edge technologies, produce one or more thesis publications, and go on to professional schools or employment. Since 2010 he has mentored 40 undergraduates (20 in last 2 yr) and 2 high school students. His undergraduates have (co)authored 16 publications, presented their research externally at numerous conferences, and earned national and regional awards (NSF graduate fellowship, AICHE, NYCS, J&J, ERPC, NSF-REU, etc.) and gone on to the best graduate programs (UC Berkeley, Penn State, Princeton, Notre Dame, Yale, etc.).

Dismukes supervises a professional training program for PhD research scientists. Since 2010 he has trained 20 fulltime graduate students, awarded 8 PhDs and 5 MS degrees. They have earned national fellowships (NSF grad, NSF-IGERT (2), NDSEG (2), GAANN, National Portugal, National Brazil, National Vietnam, Rutgers Busch, Rutgers Waksman, Rutgers BIOMAPS). All PhD graduates have been placed in public or private firms (ALG-4, BASF (2), EXXON-MOBIL, Joule Biotechnology (2), McKinnon, DOE-NREL), or taken postdoc positions (Yale U.) or been appointed to academic faculty (Louisiana State Univ.). One PhD graduate was advanced to tenure in 2015 (TIFR-Mumbai).

Dismukes has trained 7 postdoctoral fellows since 2010; two have taken academic or professional positions: UConn teaching faculty, AAAS-fellow in residence at the NSF, One has moved to biotech industry, 4 fellows are continuing. An earlier postdoc was advanced to tenure (Marshall Univ., W Va).

**Scholarship:** Dismukes' laboratories have been staffed by 74 coworkers, as listed in his CV. Together with students and collaborators he has published 48 manuscripts in peer reviewed journals and filed 4 patent applications. His research productivity from 2010 to 2015, as measured by [Google Scholar](#), lists 5,061 citations of his publications. This compares to a nearly equal number of 5551 citations of his work over the previous 31 years, from 1979 through the end of 2009, roughly a six-fold increase in mean productivity rate since 2010, which coincides with his arrival at Rutgers. His cumulative [h-index](#) is 55 (33 since 2011), cumulative [i10-index](#) 137 (92 since 2011); His Research Gate RG Index is 45. He has been ranked consistently by RG as the most cited member of the Rutgers CCB department over the past year. He has given 48 public lectures/presentations at conferences, etc. He has received the following external awards: 2010 Excellence in Catalysis Award, from the Catalysis Society of Metropolitan New York. In 2011, he and Martha Greenblatt shared an award as finalists in the ConocoPhillips Energy Prize Competition.

### **State, National & International Service**

- New Jersey Energy Master Plan, advisor to the governor's staff: Kenneth Esser & Nancy Belonzi. 2010
- New Jersey Dept Environmental Protection, advisor to staff, Mr John Scott. 2010
- Solar Fuels Institute (SOFI), Founding member & member of the executive comm. 2012-ongoing
- BASF The Chemical Co., advisor to 4 research teams in three divisions as listed in CV. 2012- ongoing.
- NATCO Pharma Co., advisor and research contractor 2011-2013
- Member of the International Advisory Committee of the State Key Laboratory of Clean Energy Utilization , Zhejiang University, Hangzhou, China. 2008-2013
- National Program reviewer for DOE-BES, DOE-EERE, DOE-H2, DOE-NREL, AFOSR, NSF-GETF, NSF-Inorg Chem, GCEP-Stanford U.
- Manuscript reviewer for ACS, RSC, APS, PNAS, ASBMB, Elsevier, Wiley, 53 manuscripts last 2 yr.

**Service to Rutgers.** Dismukes' statement "I believe it is my duty to serve the administrative units at Rutgers who contribute to making my professional experiences so rewarding and productive." Dismukes' service to Rutgers extended over 5 administrative units: SAS, SEBS, CCB, Waksman, and IAMDN:

- IAMDN Executive Committee, 2013-ongoing
- CCB External Awards Committee, Chair
- CCB Inorganic Division
- CCB Graduate Admissions Committee
- CCB Graduate Recruiting Committee
- Waksman Institute Directors Committee
- Waksman Institute, External Awards Committee
- SEBS MBB Graduate Admissions
- SEBS MBB Comprehensive Exam Committee
- SAS Ad Hoc Promotions Committee, 2010
- SAS Ad Hoc Alumni Relations/Reunions, secured \$50K for Rutgers Tech Advance, 2012-2015

## **Complete Curriculum Vitae through June 2016**

### **EDUCATION**

Lowell Technological Institute, Lowell, MA	Chemistry, High Honors,	BS 1971
Univ. of Wisconsin, Madison, WI	Radiation Phys. Chemistry, Mentor: John Willard	PhD 1976
Univ. of California, Berkeley, CA Lab. of Chemical Biodynamics	Biophysical Chemistry Mentors: Kenneth Sauer & Melvin Klein	1976-1978

### **POSITIONS AND EXPERIENCE**

- Executive Committee, Rutgers Institute of Advanced Materials & Device Nanotechnology 2013-
- Distinguished Professor, Rutgers University 2009-
- Department of Chemistry & Chemical Biology, faculty laboratory director 2009-

- Waksman Institute of Microbiology, faculty laboratory director 2009-
- School of Environmental and Biological Sciences, graduate training program 2009-
- Full, Associate & Assistant Professor: Dept. of Chemistry, Princeton University 1991, 1984, 1978
- Visiting Professor Zhejiang University, Hangzhou, China 2008
- Affiliated member the Princeton Materials Institute 1990
- Affiliated member the Princeton Environmental Institute 1995
- Visiting Professor Université Joseph Fourier, Grenoble France, 1997
- Visiting Professor Kansai-Gaikun University, Nishinomiya, Japan 1997
- Visiting Research Scientist: Squibb Institute for Medical Research, Princeton 1991
- Visiting Scientist Service de Biophysique, Dept. de Biologie, CEN-Saclay 1984

#### **AWARDS:**

- 1969, 70, 71 Top chemistry student award Lowell Technological Institute & BS with high honors
- 1971 American Institute of Chemistry Outstanding Senior Award, New England Chapter
- 1972-75 DOE Predoctoral Scholarship, University of Wisconsin
- 1975 Sigma Xi Graduate Research Award, University of Wisconsin
- 1975-78 DOE Postdoctoral Fellowship Lab. of Chemical Biodynamics, University of California
- 1979 DuPont Young Faculty Award
- 1981-83 G. D. Searle Scholars Award
- 1983 Monbusho Visiting Lectureship (Japan's Ministry of Education) RIKEN Symposium
- 1984-86 Alfred P. Sloane Award
- 1987 Monbusho Visiting Lectureship (Japan's Ministry of Education) NIBB, Okazaki
- 1984 Visiting Research Fellowship, Service de Biophysique Departement de Biologie, CEN-Saclay
- 1991 Squibb Institute Fellowship, Visiting Research Scientist
- 1992 Japan Society for the Promotion of Science Distinguished Visiting Fellowship Kyoto University
- 1992 National Research Council Fellowship
- 1997 CNRS Distinguished Visiting Fellow Universite Joseph Fourier, Grenoble France
- 1997 NRSA Fogarty International Fellow
- 1997 Japan Society for the Promotion of Science Distinguished Visiting Fellow Kansai-Gaikun Univ.
- 2004 Lemberg Award, Australian Academy of Sciences;
- 2008 Chinese Bioenergy Association Award, Chinese Academy of Sciences
- 2010 Excellence in Catalysis Award, Catalysis Society of Metropolitan New York
- 2011 ConocoPhillips Energy Prize Finalist

#### **RESEARCH PROFILE**

*Areas:* Catalysis, inorganic chemistry, bioinorganic chemistry, organometallic chemistry, solid-state chemistry, materials properties, photosynthesis, metabolism

*Focus:* renewable energy sciences; synthesis of transition metal catalysts for artificial photosynthesis, design of photoelectrochemical cells, biofuels, photosynthetic water oxidation, engineering of microalgae, tools for investigating these systems.

#### ***National & International Public Service, 2010 –present, & selected***

2016 DOE-EERE Workshop on Future Needs for Advanced Water Splitting: Eric Miller convenor. Stanford University. <https://app.certain.com/profile/web/index.cfm?PKwebID=0x8315365e2d&varPage=attendee>

2016, 2015 & 2013 DOE Hydrogen and Fuel Cell Technologies Research, Development and Demonstrations; Review panel.

2015 NSF Division of Chemical, Bioengineering, Environmental, and Transport Systems (CBET), Sustainability Review Panel (Microbial biofuels); Proposal review panel.

2014 DOE-H2A Technoeconomic Review Panel.

2013 DOE Hydrogen Production Program; panelist & reviewer.

2013 Somerset County NJ, Board of Engineers

2013- continuing, SOFI –Solar Fuels Institute, member of the advisory committee.

- 2012 Collaborated with **DOE-Caltech Joint Center for Artificial Photosynthesis** to develop benchmarking standards for electro-catalysts. Dr. Charles McCrory.
- 2012 Founding member and Rutgers representative to **SOFI –Solar Fuels Institute** . Director: Dr. M. Wasielewski. SOFI is a consortium of investigators from research universities, private and national labs seeking to accelerate the pace of technological advances needed to transition to solar produced fuels.
- 2010 **DOE-BES Innovation Hub-Fuels from Sunlight**, proposal: “Solar Fuels Institute of America”, selected one of the four finalist proposals in national competition for DOE Innovation Hub. coPI of Rutgers catalysis subgroup (M. Wasielewski, PI, Northwestern U).
- 2010 State of New Jersey, Energy Master Plan, advisor to governor’s staff, Kenny Esser; Nancy Belonzi.
- 2005-2011 Director of multi-institutional BioSolarH2 team, AFOSR-MURI;
- 2003 Advisor/Coauthor to the **US DOE-BES Workshop on Hydrogen Production Technologies**: roadmap report on *"Basic Research for Hydrogen Production, Storage and Use"* (organizer Mildred Dreselhauser) Symposium chairs: T. Mallouk and L. Mets; June. [http://hydrogen.anl.gov/pdfs/2003\\_hydrogen\\_workshop.pdf](http://hydrogen.anl.gov/pdfs/2003_hydrogen_workshop.pdf)

### **Service to the Profession, 2010-**

- 2016- advisory: [BASF The Chemical Company, Environmental Catalysis Division](#), Iselin, NJ, Dr. Wolfgang Ruettinger
- 2014-2015 advisory: [BASF The Chemical Company, Electrochemistry Division](#), Ludwigshafen, Germany; Drs. Domnik Bayer and Marin Krauss
- 2014-2015 advisory: [BASF The Chemical Company, Analytical Services Division](#), Iselin, NJ; Dr. Prasad Subramanian.
- 2012 advisory: [BASF The Chemical Company, Environmental Catalyst Division](#), Iselin, NJ; Drs. Gerald Koermer and Xiaofan Yang.
- 2011-2013 Advisory: [NATCO Pharma](#); Director of Research: Dr N. Rao.
- 2013-2008 Member of the International Advisory Committee of the State Key Laboratory of Clean Energy Utilization , Zhejiang University, Hangzhou, China; Director: Zhongyang Luo & Kefa Cen;
- National Program reviewer for: DOE-BES, DOE-NREL, AFOSR, NSF-GETF, NSF-Inorganic Chemistry Div., NSF-Metabolic Biochemistry; Canadian National Science & Engineering Research Council, AGENO; NIH Metallobiochemistry Resource Center Study Group for National EPR Facilities; NIH Molecular Biophysics Training Grant Study Group; NIH-Chem&Bioanalytical Science Rev. Panel; NIH- Postdoctoral Award Review Panel
- Founding Member Soc. Biological Inorganic Chem. & Editorial Board, J.Biological Inorganic Chemistry
- American Chemical Society: member, nat. meeting symposium organizer, past President Princeton Chapter
- Consultantships: 2011-2014 BASF; 2011 NATCO; 2009 New Energy Venture Partners, 2008: V.P. Engineering Analysis, Directed Technologies, Inc., 2008: Venrock VC, 2008: Ergo Advisors; 2008: National Renewable Energy Laboratory; 2007: GCEP-Stanford University; 2004: Bingham McCutchen; 2001: Sarnoff Laboratories; 2001: Agere Systems; 2001: Allied Innovative Systems; 2000: NJ Dept Environmental Protection; 1999: Sakana Inc.

### **Selected Activities and Honors**

- 2016 Microbiology Symposium, Rutgers SEBS, Feb 26.
- 2016 hosted visiting scholar Dr. Dmitry Shevela, Umea University, Sweden, Mar 10-24.
- 2016 New York Metro Catalysis Symposium at Rutgers, New Brunswick. March 23.
- 2016 DOE-EERE as listed above.
- 2016 Rutgers LSM Symposium, April 4.
- 2016 Eastern Regional Photosynthesis Meeting, Marine Biological Lab, Woods Hole, MA, April 8.
- 2016 National Renewable Energy Laboratory, Golden, CO, consultation with Andriy Zakutayev, April 22.
- 2016 Rutgers Energy Institute Symposium, May 4
- 2016 International Hydrogen Production Conf., Hanzhou, China; paper & chaired session. May 8-12.
- 2016 launch of the Rutgers-Zhejiang joint project for Global Climate and Energy Project and tour of the Yantai bioreactor facility. Zhejiang University, Hanzhou, China, May 13-14.

- 2016 229th ECS Meeting, 2 oral papers and 1 poster in the divisions of Physical and Analytical Electrochemistry, Electrocatalysis, and Photoelectrochemistry, May 29 - June 3.
- 2015 GRC Photosynthesis, Bentley Univ. Waltham, MA, July
- 2015 Eastern Regional Photosynthesis Conference, Wood Hole, MA, April
- 2015 invited speaker, Electrochemical Society National Meeting, Chicago, May
- 2015 invited speaker, NERM Northeast Regional Meeting American Chemical Society, Cornell Univ. convenor: Nikolay Dimitrov, June 11-12.
- 2014 **American Chemical Society National Meeting**, San Francisco August 10-14.
- 2014 invited speaker, **BASF Chemical Company**, Ludwigshafen, Germany, July 22.
- 2014 Catalysts for Chemical Energy Conversion, **Max Planck Institute for Chemical Energy Conversion**, Mulheim, Germany, July 23-25, convenor: D. Savitsky and W. Lubitz.
- 2014 invited speaker, **Gordon Research Conference: Renewable Energy: Solar Fuels**, Ventura, CA Jan, 19-24 2014, convenors: Mike Wasielewski & Stenborn Styring.
- 2014 participant, **Solar Fuels Institute**, SOFI Demo Project Planning Meeting, Ventura, CA Jan, 22, convenor: Dick Co.
- 2014 invited speaker, **Umeå Renewable Energy Meeting**, Chemical Biological Centre KBC KB3B1, **Umeå University**, Sweden, 17-19 March 2014, convenor: Johannes Messinger.
- 2014 speaker, **Solar Fuels Institute (SOFI)** Rutgers representative at annual meeting, Uppsala, Sweden, June 11-13.
- 2014 **Eastern Regional Photosynthesis Congress**, April, Woods Hole, MA
- 2014 **Catalysis Society of Metropolitan New York**, Annual Conference, Lehigh University, Bethlehem, PA, March
- 2014 **American Chemical Society National Meeting**, New Orleans, February,
- 2014 **Annual Meeting of Laboratory for Surface Modification**, Rutgers University, NJ, convenor: R. Bartinski, March 28.
- 2013 speaker, **AFOSR Annual Bioenergy Grantee Meeting**, BioSolarH<sub>2</sub>, convenor: Dr Patrick Bradshaw, October 28-29.
- 2013 invited participant, **DOE-BES Photosynthetic Systems Grantee Meeting**; convenors: Drs. G. MacLean and R. Stack. November.
- 2013 invited speaker and panelist, **DOE-EERE Biohydrogen Production Workshop** at NREL, Golden, CO, convenor: Dr. Sara Dillich, September 24-25.
- 2013 10th International Hydrogenase Conference, Szeged, Hungary, convenor: Karl Kovacs, 8-12 July 2013
- 2013 invited speaker, **ICCGGE: Int Conference on Chloroplast Genomics and Gene Expression**, Rutgers University, NJ, convenor: Pal Maliga, May 11-13.
- 2013 **Catalysis Society of Metropolitan New York**, Annual Conference, Princeton, NJ, March
- 2013 Presenter Technology Showcase, **APRA-E Energy Innovation Summit**, Washington D.C. Feb 25, 2013. Rutgers bioinspired electrocatalysts for solar hydrogen and electrical energy storage.
- 2013 Conferee and SOFI representative, **APRA-E Energy Innovation Summit**, Washington D.C. Feb 25.
- 2013 SOFI booth at the APRA-E Energy Innovation Summit**, Washington D.C. Feb 25. Convenor: Dick Co.
- 2013 **Internat. Hydrogenase Conference**, Budapest, Hungary, May, convenor: Kornel Kovacs
- 2012 Rutgers representative at annual meeting of **TheSolar Fuels Institute (SOFI)** Telluride, CO. August. SOFI is a new international organization founded to promote renewable fuels derived from solar energy.
- 2012 participant, **DOE-BES Photosynthetic Systems Grantee Meeting**; November, convenor: Drs. G. MacLean and R. Stack.
- 2012 Invited plenary speaker, **Midwest Photosynthesis Meeting**; November, convenor: Dr Harvey Hou.
- 2012 Invited plenary speaker, **244<sup>th</sup> National Meeting of the American Chemical Society**, Div Energy & Fuels, Symposium on “**Catalysis for Renewable Energy**”, Philadelphia, PA, August 19-23, Convenors, Drs. Ted Krause and Brent Shanks
- 2012 speaker, **244<sup>th</sup> National Meeting of the American Chemical Society**, Div Inorganic Chem. Symposium on “**Bioinorganic Chemistry**”, Philadelphia, PA, August 19-23.



- 2012 participant, **Gordon Research Conference: Photosynthesis**, Davidson College in Davidson, NC, July 8-13, 2012.
- 2012 speaker, **AFOSR Annual Bioenergy Grantee Meeting**, BioSolarH<sub>2</sub> MURI, June
- 2012 participant, **Gordon Research Conference: Renewable Energy: Solar Fuels**, Tuscany (Barga) Italy, May 13-18, 2012, convenors: Tom Mallouk and Wolfgang Lubitz.
- 2011 Speaker, **NSF Workshop on Basic Research Needs for Algal Biofuels**, Arlington, VA, Nov 21, convenor: KF Reardon.
- 2011 Panelist, **Solar Fuels Workshop: Roadmapping for Success**, SOFI -Solar Fuels Institute, Northwestern University, Evanston, IL, Nov 17-18, convenor: M. Wasielewski.
- 2011 Speaker, **DOE-BES Photosynthetic Systems Grantee Meeting**; Nov 7-9, convenor: Drs. G. MacLean and R. Stack.
- 2011 Invited plenary speaker, **National Meeting of the American Chemical Society**, Inorganic subdivision symposium on Solar Photocatalysis, Denver, CO, August. Convenors: Drs. Damrauer, Rappe and Shores.
- 2011 Speaker, **AFOSR Annual Bioenergy Grantee Meeting**, BioSolarH<sub>2</sub> MURI, June.
- 2011 Speaker, **BASF Catalyst R&D**, Iselin, NJ May 10, 2011
- 2011 Speaker, **San Diego Center for Algal Biofuels**, “*Algal Biofuels - Advancing to Economic Viability*” Univ. California San Diego, convenor: S. Mayfield. April 29 - 30, 2011
- 2011, Speaker, **Bioorganic Gordon Research Conference**, Proctor Academy, NH, convenor: T. Dore
- 2011 Plenary lecturer, “Nanostructured Electromaterials and New Materials for Energy” **ARC Centre for Electromaterials Science**, Univ. Wollongong, Australia, convenor Gordon Wallace.
- 2010 **DOE-BES Innovation Hub-Fuels from Sunlight**, proposal: “Solar Fuels Institute of America”, selected one of the four finalist proposals in national competition for DOE Innovation Hub. PI of Rutgers catalysis subgroup (proposal PI: M. Wasielewski, PI, Northwestern U).
- 2010 Plenary lecturer, **Weizmann Institute of Science, Workshop on Light-driven Bioprocesses: from Basics to Applications**. Rehovot, Israel, convenors: Uri Pick and Elisha Tel-Or.
- 2010 **Weizmann Institute of Science, Alternative Energy Seminar Series**, Feinberg graduate school; convenor: David Cahen.
- 2010 Plenary lecturer, **Internat. Hydrogenase Conference**, Uppsala, Sweden, convenor: P. Lindblad.
- 2010 Plenary lecturer, ANSER , **Solar Fuels for the Future**, 3rd Annual Solar Energy Symposium, Northwestern University, Evanston, IL. May 6-7. Convenor: Michael Wasielewski
- 2010 plenary lecturer, 27<sup>th</sup> **Eastern Regional Photosyn. Conf.**, Marine Biological Laboratory, April  
Convenor: Philippe Juneau.

**CURRENT, PENDING & EXPIRED SUPPORT, 2010-current; total awarded \$ 5,255,462**

**Current, 2016-**

<b>National Science Foundation – Chemistry of Life Processes, #1213772</b>	\$350,000
“Probing the Catalytic Core of Photosynthetic Water Oxidation, Atom by Atom”	
Dismukes (PI)	08/15/12 – 08/14/16
<b>Department of Energy – Basic Energy Sciences</b>	\$495,000
“Revealing and applying the principles of water oxidation by oxygenic photosynthesis”	
Dismukes (PI)	09/01/13 – 08/31/16
<b>NSF-CBET/DOE-EERE joint</b>	\$799,496
“Tunable Photoanode-Photocathode-Catalyst-Interface Systems for Efficient Solar Water Splitting”	
Dismukes (PI), M. Greenblatt and R. Garfunkel (coPIs)	09/01/2014 – 08/31/2017
<b>National Science Foundation-MCB</b>	\$762,364 Rutgers (50% Dismukes sub)
“Computational and Experimental Systems Biology of Cyanobacterial Metabolism”	
Desmond Lun (PI); coPI GC Dismukes	08/01/2015 - 07/30/2018
<b>Global Climate Energy Project -Stanford</b>	\$1,220,127

“Robust Microalgal Production Strains for High Yield Growth on Fossil Fuel Gas: Toward Cost Effective Biofuels and CO<sub>2</sub> Mitigation”

Dismukes, GC (PI)

10/15/2015-10/14/2018

**Rutgers alumni gift**

\$50,000 Rutgers Tech Advance (50% subaward, \$25,000)

**Pray Family Fund** “Solar Fuels Demonstration Project”

Dismukes, GC

**BASF-Chemical, Analytical Division, Iselin**

\$69,665

“EPR of metal doped molecular sieves”

07/01/14 –06/30/16

Dismukes (PI), P. Subramanian (coPI)

**Department of Energy – Basic Energy Sciences**

\$80,000

“Photosystem II Water Oxidation: Mechanism, Efficiency & Flux in Diverse Oxygenic Phototrophs”

Dismukes (PI), Ananyev (coPI)

Sept 2016- Aug 2017

**Expired 2010-2015:**

**Air Force Office of Scientific Research, FA-9550-05-1-0365**

\$1,100,000

“Bio-solar Hydrogen Production from Robust Oxygenic Phototrophs (Renewal)”

Dismukes (PI)

2 person-months per year

08/15/11 – 02/14/15

**DOE-EERE-SBIR**

\$45,000 (Rutgers subcontract)

Rutgers – Proton OnSite ” Phase 1 SBIR: Non-Platinum Group Metal OER/ORR Catalysts for Alkaline Membrane Fuel Cells and Electrolyzers”

N. Danilovic (PI), K. Ayers, GC Dismukes

2/1/2015-10/31/2015

**NATCO Pharma Co.**

\$363,800

“Synthesis of Transition Metal Thiospinels, AM<sub>2</sub>S<sub>4</sub> as Reduction Catalysts for the Splitting of Water”

GC Dismukes and M. Greenblatt, coPIs

April 1, 2012- March 31, 2014

*Pending:*

**NSF MRSEC IRG** “Electro-catalysis for Reactive Materials” in preparation

**NSF CCI** “Quantum Electro-catalysis for Use with Emerging Solar Driven Energy Resources ” in preparation.

**RESEARCH GROUP: Rutgers CCB Dept & Waksman Institute, total staff of 74 coworkers in the last 5 yrs**

**Visiting Faculty, Total 14 total, 2010-current**

Prof. John Sheats, Rider University, Summer 2010

Dr. Dmitry Shevela, Umea University, Sweden, March 2016

**Technical Staff, 2010-current; ongoing appointments**

Research Associate Professor: Dr. Gennady Ananyev (1994-current)

Technician: Mr. Bryan Mejia-Sosa, 2016-current; BSE engineer, mass spectrometry and metabolomics.

**Postdoctoral Advising, 2010-current; 5 currently**

Postdoctoral Associates: 7 in last 5 yrs (27 total):

Current: Drs. Spencer Porter, Anders Laursen,

2010-2016: Anagha Krishnan, Paul F. Smith, G. K. Kumaraswamy, Clyde Cady, Elizabeth Burrows

**Graduate Student Mentoring, 2010-current; 20 fulltime in the last five years; 8 PhDs & 5 MS**

Ph.D. Students: (38 total): **transfers from Princeton U:** Louis T Guerra, Kelsey McNeely, Nicholas Bennette, Nicholas Skizim, David Vinyard, David M Robinson, Robin Brimblecombe (visiting); **Rutgers U:** PhDs and Phd Candidates: Anagha Krishnan, Graeme Gardner, Paul F. Smith, Xiao Qian, Colin Gates, Yuan Zhang, Karin Calvino, Shinjae Hwang, Hoa Vu.

MS Thesis Students: Viral Sagar, Ankit Dasgupta; Mario Cornejo, Bin Liu, Nicholas Rose

### ***Undergraduate Student Mentoring, 2010-current: 20 in the last two years; ~ 40 in the last five years***

Current undergraduate researchers **2015-16:** Shannon Chang, Ajay Kashi, Edward Izett, Tim Goetjen, Josh Pateluna, Jack Weber, Avinash Garlapati, Rachel Allen, Jonah Williams, Brendan Cullinane, Shivam Kaushik, Areeb Zaidi, **2014-15:** honors theses: Jennifer Sun, Christopher Kaplan,; Kinan Tadmori, undergraduate assistants in research: Kelly Patraju, Albert Magnell, Nicholas Mezle, Jessica Gonzalez, Yifan Wang, Donald Chawla, high school assistant: Liam Hunt.

### ***Classroom Teaching***

- SAS, Advanced Inorganic Chemistry: (471/571 mixed graduate & undergraduate) annually
- SAS, Inorganic Chemistry : (371, undergraduate) spring 2015
- SEBS, Microbial Biochemistry (502, graduate) annually
- SAS, Harnessing Solar Energy (421, undergraduate) multiple lectures, annually
- SAS, Integrated Energy Challenges and Opportunities: NSF IGERT Training Program (spot lectures)

### ***Committees***

- IAMDN Executive Committee, 2013-ongoing
- CCB External Awards Committee, Chair
- CCB Inorganic Division
- CCB Graduate Admissions Committee
- CCB Graduate Recruiting Committee
- Waksman Institute Directors Committee
- Waksman Institute, External Awards Committee
- SEBS MBB Graduate Admissions
- SEBS MBB Comprehensive Exam Committee
- SAS Ad Hoc Promotions Committee, 2010
- SAS Ad Hoc Alumni Relations/Reunions, secured \$50K for Rutgers Tech Advance, 2012-2015

### ***PATENTS and TECHNOLOGY TRANSFER, 2010-***

- Dismukes, G.C. and Greenblatt, M. 2011, Spinel Catalysts for Water and Hydrocarbon Oxidation. USPTO 8,932,977 B2, Issued January 13, 2015.
- Translation of Research to Industry, Licensing Stage: Rutgers OER Spinel LiCoO<sub>2</sub> was licensed to NATCO Corporation, 2013-2014.
- RU Patent disclosure: Dismukes, G. C., Greenblatt, M. & Laursen, A. "Nickel phosphides electro-catalysts for hydrogen evolution reactions" US PCT filed Dec 31, 2013.
- RU Patent disclosure, Dismukes, G. C., Greenblatt, M. & Laursen, A., Whitaker, M., "Nickel-3 phosphide (Ni<sub>3</sub>P) a low phosphorous hydrogen evolution electrocatalyst" - provisional application; docket #2015-151; ref. 070439.01097. Amended title: "Nickel phosphides and nickel phosphide:iron phosphide alloys as hydrogen evolution electrocatalysts".
- RU Patent disclosure: Dismukes, G. C., Greenblatt, M., Laursen, A., Calvino, K. "Transition metal phosphides as a new type of catalyst for direct electrochemical CO<sub>2</sub> reduction to hydrocarbons" NOI filed October 7, 2015.
- 7 patent applications total

### ***PUBLICATIONS***

**200+ Refereed Publications in total, sorted below in two areas:**

**A) Selected publications materials & catalysis, Refereed Journal Papers, since 2006-**



- Porter, S.H., S. Hwang, V. Amarasinghe, E. Taghaddos, V. Manichev, M. Li, G. Gardner, A. Safari, E. Garfunkel, M. Greenblatt and G.C. Dismukes, *Optimizing the "Artificial Leaf" Photoanode-Photocathode-Catalyst Interface Systems for Solar Water Splitting*. **Electrochemical Society Transactions**, 2016. in review.
- Smith, P.F., B.J. Deibert, S. Kaushik, G. Gardner, S. Hwang, H. Wang, J.F. Al-Sharab, E. Garfunkel, L. Fabris, J. Li and G.C. Dismukes, *Coordination Geometry and Oxidation State Requirements of Corner Sharing MnO<sub>6</sub> Octahedra for Water Oxidation Catalysis: An Investigation of Manganite ( $\gamma$ -MnOOH)*. **ACS Catalysis**, 2016. **6**(3): p. 2089–2099.
- Laursen, A.B., M.J. Whitaker, M. Greenblatt and G.C. Dismukes, *Ni<sub>3</sub>P a low phosphorous hydrogen evolution electrocatalyst*, submitted. 2016.
- Gardner, G., J. Al-Sharab, N. Danilovic, Y.B. Go, K. Ayer, M. Greenblatt and G.C. Dismukes, *Structural basis for differing electrocatalytic water oxidation by the cubic, layered and spinel forms of lithium cobalt oxides*. **Energy Environ. Sci.**, 2016. **9**: p. 184–192.
- Davis, K.M., M.C. Palenik, L.F. Yan, P.F. Smith, G.T. Seidler, G.C. Dismukes and Y.N. Pushkar, *X-ray Emission Spectroscopy of Mn Coordination Complexes Toward Interpreting the Electronic Structure of the Oxygen-Evolving Complex of Photosystem II*. **Journal of Physical Chemistry C**, 2016. **120**(6): p. 3326-3333.
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