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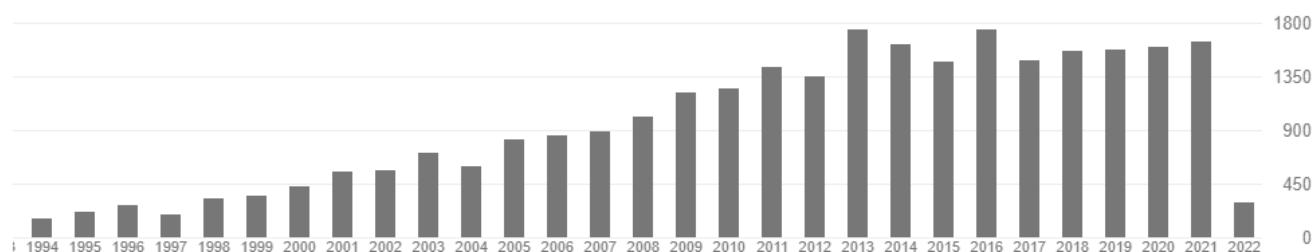
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- Bedade, Dattatray K.; Edson, Cody B.; Gross, Richard A. (2021) Emergent approaches to efficient and sustainable polyhydroxyalkanoate production, *Molecules* 26(11), 3463. <https://doi.org/10.3390/molecules26113463>
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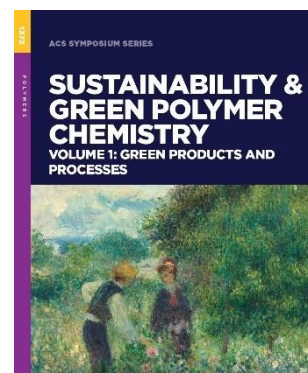
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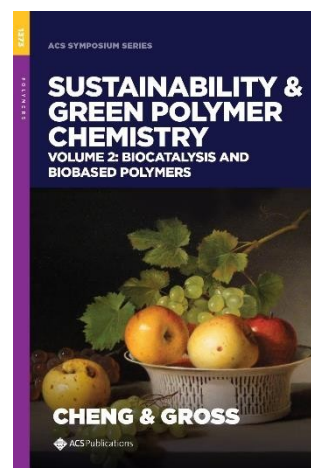
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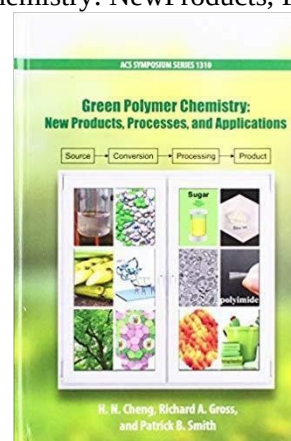
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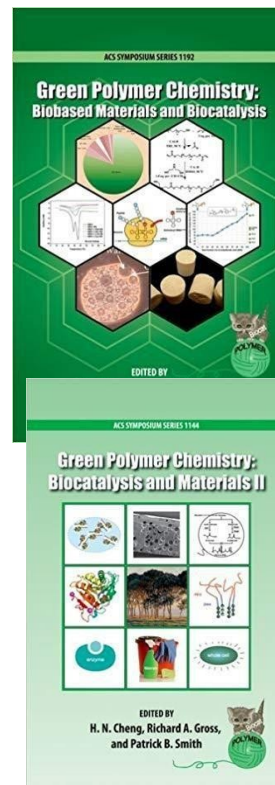
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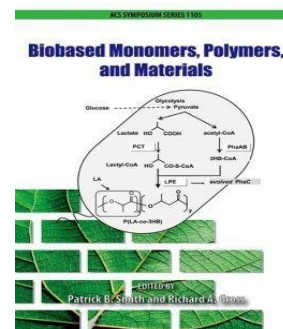
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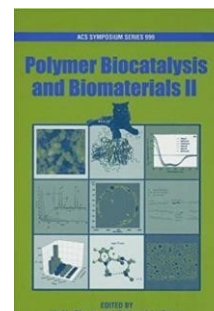
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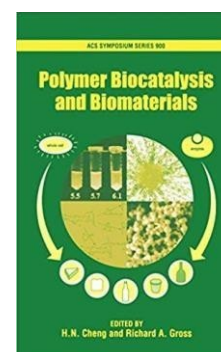
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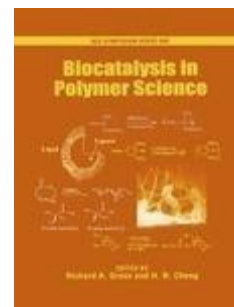


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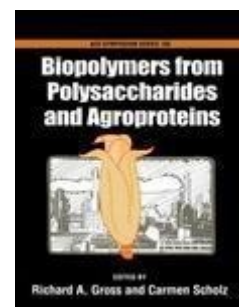


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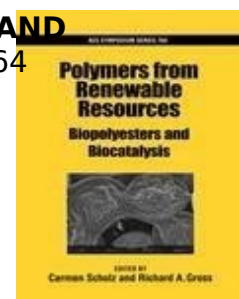
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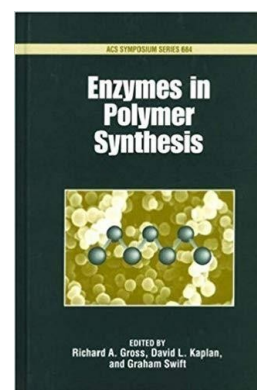
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**INVITED LECTURER**

**Title:** Microbially produced biosurfactants: general introduction & sophorolipid case-study

**Place/Event:** 26th Bio-Environmental Polymer Society (BEPS): @ Clemson University, Clemson, SC. Appreciation Day, The University of Akron, College of Polymer Science and Polymer Engineering.

**Date:** May 17, 2019

**INVITED LECTURER**

**Title:** Expanding opportunities in polymer chemistry using Biocatalysis

**Place/Event:** Polymer Appreciation Day, The University of Akron, College of Polymer Science and Polymer Engineering.

**Date:** May 17, 2019

**INVITED LECTURER**

**Title:** Expanding the Role of Enzyme-Catalysis in Macromolecular Synthesis.

**Place/Event:** Closing the Loop on the Plastics Dilemma: A Chemical Sciences Roundtable Workshop; The National Academies of Sciences, Engineering, and Medicine 500 Fifth Street NW, Washington, DC 20001

**Date:** May 9-10, 2019

**INVITED LECTURER**

**Title:** Biological Depolymerization: Biocatalysis

**Place/Event:** Workshop on Sustainable Materials and Processes, Northwestern Institute for Sustainability and Energy

**Date:** January 10, 2019

**PLENARY LECTURE**

**Title:** Plastic Biorecycling and Biobased Replacements

**Place/Event:** Future of Surfactants Summit North America (Chicago, IL)

**Date:** September 19-20 2018

**PLENARY LECTURE**

**Title:** Sophorolipids: Simple-Scalable Modification Increases Cost-Performance Metrics

**Place/Event:** Bio-environmental Polymer Society 2018 25th Anniversary Meeting (Rensselaer Polytechnic Institute Troy, NY)

**Date:** August 15-17

**PLENARY LECTURE**

**Title:** Plastics Here, There and Everywhere

**Place/Event:** Third International Symposium on Materials from Renewables (ISMR)

**Date:** July 17-18 2018

**INVITED LECTURER**

**Title:** Biocatalysis Enables New Options in Polymer Science

**Place/Event:** 10<sup>th</sup> International Conference on Fiber and Polymer Biotechnology (Ballneário Camboriú, Brazil)

**Date:** April 24-27 2018

**PLENARY LECTURE**

**Title:** Leaf Branch and Compost Cutinase and Ultra-Thin Bacterial Cellulose

**Place/Event:** Lecture at Montana State University

**Date:** March 5-6<sup>th</sup> 2018

**COLLOQUIUM SPEAKER**

**Title:** The expanding role of enzyme-catalyzed synthesis of polymers, surfactants and peptides.

**Place/Event:** NREL Denver, Colorado

**Date:** January 13-16 2018

**Internal Organizational Meeting**

**Title:** Advanced Hierarchical Materials for a Circular Economy

**Place/Event:** 2<sup>nd</sup> Annual Biocarbon Research Meeting (Guelph, Ontario, Canada)

**Date:** November 17, 2017

**PLENARY LECTURE**

**Title:** Bio- and Chemo-Catalytic Routes to Biobased Materials

**Place/Event:** BEPS 2017 (Albany, California)

**Date:** September 20-22 2017

**PLENARY LECTURE**

**Title:** Sustainable Routes to Biobased Epoxy Resins, Fiber Matrices, Peptides and PET Deconstruction

**Place/Event:** BIOPOL 2017 Mons, Belgium. September 11-13, 2017

**Date:** September 11-13, 2017

**PLENARY LECTURE**

**Title:** Exploring Non-Conventional Approaches to Biobased Materials Synthesis and Applications

**Place/Event:** 254th ACS National Meeting & Exposition, Washington, DC, USA,

**Date:** August 20-24, 2017

**Title:** Engineered cutinases for PET and cellulose acetate hydrolysis: Design, structure and properties

**Place/Event:** 254th ACS National Meeting & Exposition, Washington, DC, USA,

**Date:** August 20-24, 2017

**Title:** Bio-based epoxy resins: Design, structure and properties

**Place/Event:** The International Symposium on Green Chemistry (La Rochelle, France)

**Date:** May 18<sup>th</sup> 2017

**PLENARY LECTURE**

**Title:** Biocatalysis Enables New Options in Polymer Science

**Place/Event:** State University of New York at Albany (Albany, NY)

**Date:** January 31 2017

Seminar Series

Lecture

**Title:** Enzyme-catalyzed synthesis of polymers, surfactants and peptides

**Place/Event:** Green Materials Conference (London, UK)

**Date:** December 12<sup>th</sup> 2016

Keynote Lecture

**Title:** Biocatalysis Enables New Options in Polymer Science

**Place/Event:** Scientific Inauguration for the European Center of Biotechnology and Bioeconomy (CEBB) (Reims, France)

**Date:** September 7-9

2016 Keynote Lecture

**Title:** Green Biobased Polymers: An Interdisciplinary Effort

**Place/Event:** CUNY Advanced Science Research Center (Philadelphia, PA, USA)

**Date:** November 15<sup>th</sup> 2016

Invited Lecture

**Title:** The expanding role of chemo-enzymatic transformations on surfactants, peptides and cellulose nanomaterials

**Place/Event:** Future of Surfactants Summit North America (Philadelphia, PA, USA)

**Date:** September 28-29<sup>th</sup> 2016

Invited Lecture

**Title:** Sophorolipids: Modification Allows Tuning of Properties

**Place/Event:** International Symposium on Bioplastics, Biocomposites and Biorefining (ISBBB-2016) (Guelph, Canada)

**Date:** May 31-June 3 2016

Organized and presented at a

Workshop Workshop and Lecture Title

**Title:** Biocatalytic Routes to Monomers and Polymers

**Place/Event:** 8<sup>th</sup> International Conference and Exhibition on Biopolymers and Bioplastics (San Antonio, Texas, USA)

**Date:** September 12-14 2016

**Served as Conference Organizer and Program Chair**

Plenary lecture

**Title:** Structure-property relationships of biobased epoxy resins Workshop Lecture

**Place/Event:** 9<sup>th</sup> International Conference on Fiber and Polymer Biotechnology (Osaka, Japan)

**Date:** September 7-9

2016 Keynote Lecture

**Title:** Engineered Cutinases for Textile Polymer Surface Modification and Recycling

**Place/Event:** 14<sup>th</sup> International Symposium on Bioplastics, Biocomposites and Biorefining (ISBBB-2016) (Guelph, Canada)

**Date:** June 2, 2016

Ran and presented at the conference workshop

**Title:** Biocatalytic Routes to Biobased Monomers and Polymers

**Place/Event:** Sustainable Polymers II, ACS Division of Polymer Chemistry (Clearwater, Florida)

**Date:** May 23<sup>h</sup> 2016

Invited Lecture

**Title:** Structure-Property Relationships of biobased Epoxy Resins

**Place/Event:** Clarkson University (Clarkson, New York)

**Date:** April 15<sup>th</sup> 2016

Invited Lecture

**Title:** Sustainable Routes to Biobased surfactants and Epoxy Resins

**Place/Event:** Pacific Polymer Conference (PPC-14), Kauai, Hawaii USA

**Date:** December 9-13 2015

Invited Lecture

**Title:** Sustainable Routes to Biobased Materials from New-to-the-world Building Blocks

**Place/Event:** Rutgers University, New Brunswick, New Jersey USA

**Date:** November 24, 2015

**Invited Lecture**

**Title:** Functional Materials for Biomedical Applications

**Place/Event:** Polymers in Medicine and Biology. Sonoma Wine Country, CA, USA

**Date:** September 14 - 17, 2015

**Invited Lecture**

**Title:** Biocatalysis-enabled Routes to Unique Glycopolymers

**Place/Event:** 250th ACS National Meeting & Exposition, Boston, MA, United States

**Date:** August 16-20, 2015 .

**Lecture**

**Title:** Cutinase paradigm: Sustainable biocatalysis for polymer surface modifications and plastic recycling

**Place/Event:** 250th ACS National Meeting & Exposition, Boston, MA, United States

**Date:** August 16-20, 2015 .

**Lecture**

**Title:** Expanding the one step acid hydrolysis/Fischer esterification of cellulose nanocrystals

**Place/Event:** 250th ACS National Meeting & Exposition, Boston, MA, United States

**Date:** August 16-20, 2015 .

**Lecture**

**Title:** Biobased replacements of bisphenol A diglycidal ether in epoxy resins

**Place/Event:** 250th ACS National Meeting & Exposition, Boston, MA, United States

**Date:** August 16-20, 2015 .

**Lecture**

**Title:** Sophorolipids: Tailoring biological and physical properties by modification chemistry

**Place/Event:** International Conference and Exhibition on Biopolymers and Bioplastics, San Francisco, USA.

**Date:** August 10-12, 2015 .

**Keynote Lecture**

**Title:** Biotechnologically Enabled Bioplastics

**Place/Event:** International Conference and Exhibition on Biopolymers and Bioplastics, San



Francisco, USA.

**Date:** August 10-12, 2015 .

**Workshop Lecture**

**Title:** Biobased Polymers from Biocatalysis

**Place/Event:** 19<sup>th</sup> Annual Green Chemistry & Engineering Conference Bethesda North Marriott Conference Center, North Bethesda, Md.

**Date:** July 14-16, 2015 .

**Invited Lecture**

**Title:** Biotechnologically produced monomers: A unique family of biobased materials from  $\omega$ -hydroxylated fatty acids

**Place/Event:** 19<sup>th</sup> Annual Green Chemistry & Engineering Conference Bethesda North Marriott Conference Center, North Bethesda, Md.

**Date:** July 14-16, 2015 .

**Invited Lecture**

**Title:** Simplifying peptide synthesis by protease catalysis

**Place/Event:** 2015 Northeast Regional ACS Meeting (NERM-2015), Ithaca, New York

**Date:** June 12<sup>th</sup> 2015

**Invited Lecture**

**Title:** Enzyme Catalysis: Expanding Opportunities in Polymer Science

**Place/Event:** 12<sup>th</sup> Yeast Lipid Conference, Ghent, Belgium

**Date:** May 22<sup>nd</sup> 2015

**Invited Lecture**

**Title:** Engineered Yeast production of  $\omega$ -hydroxyfatty acids: New Platform Chemicals

**Place/Event:** 1st PIRE Workshop on Biobased Polymers and Materials in Belgium

**Date:** May 20<sup>th</sup> 2015

**Invited Lecture**

**Title:** Biocatalytic Routes to Biobased Monomers and Polymers

**Place/Event:** Belgium Polymer Group (BPG) Annual Meeting 2015, Houffalize, Belgium

**Date:** May 18,  
2015

**Invited Lecture**

**Title:** Enzyme-Catalysis: Ever Expanding Role in Polymer Science

**Place/Event:** Novozymes, Bagsvaerd, Denmark

**Date:** Friday April 17, 2015

**Invited Lecture**

**Title:** Cutinase Structure-Property Relationships

**Place/Event:** DSM, Delft, The Netherlands

**Date:** Thursday April 16, 2015

**Invited Lecture**

**Title:**

**Biosurfactants**

**Place/Event:** Evonik, Essen Germany

**Date:** Wednesday April 15, 2015

**Invited Lecture** Sophorolipid (SL) and modified SL in Cosmetics and Household Care

**Title: Green Polymer Chemistry and Biocatalysis**

**Place/Event:** BASF, Ludwigshafen, Germany

**Date:** Tuesday April 14, 2015

**Invited Lecture**

**Title: Enzyme Catalysis: Expanding Opportunities in Polymer Science**

**Place/Event:** Firmenich, Geneva, Switzerland

**Date:** Monday April 13 2015

**Invited Lecture**

**Title: Biocatalysis and Materials Science**

**Place/Event:** International Flavors and Fragrances (IFF), New Jersey, USA

**Date:** February 17<sup>th</sup> 2015

**Invited Lecture**

**Title: Green Polymer Chemistry and Biocatalysis**

**Place/Event:** The 10th SPSJ International Polymer Conference (IPC 2014), Tsukuba, Japan

**Date:** December 2-5 2014

**Invited Lecture**

**Title: New-to-the-World Polymers from Yeast Derived Glycolipid and  $\omega$ -Hydroxyfatty acid Monomers**

**Place/Event:** The 10th SPSJ International Polymer Conference (IPC 2014), Tsukuba, Japan

**Date:** December 2-5 2014

**Invited Lecture**

**Title: New-to-the-World Polymers from Yeast Derived Glycolipid and  $\omega$ -Hydroxyfatty acid Monomers**

**Place/Event:** University of Maine

**Date:** October 3, 2014

**Invited Lecture**

**Title: NSF Center for Sustainable Chemicals and Materials from Biomass (CSCMB)**

**Place/Event:** Pittsburg State University (Pittsburg, KS)

**Date:** September 26, 2014

**Distinguished Lecture Series**

**Title: Green Polymer Chemistry and Biocatalysis**

**Place/Event:** Pittsburg State University (Pittsburg, KS)

**Date:** September 25, 2014

**Distinguished Lecture Series**

**Title: Enzyme Catalysis: Expanding Opportunities in Polymer Science**

**Place/Event:** SUNY ESF Seminar Series

**Date:** September 19<sup>th</sup> 2014

**Invited Lecture**

**Title: Enzyme Catalysis: Expanding Opportunities in Polymer Science**

**Place/Event:** Rensselaer Polytechnic Institute: Department of Biomedical Engineering Seminar Series  
**Date:** September 30<sup>th</sup> 2014  
**Invited Lecture**  
**Title:** Functional Biomaterials for Biomedical Applications

**Place/Event:** Rensselaer Polytechnic Institute: Department of Biological Sciences Seminary Series  
**Date:** September 8<sup>th</sup> 2014  
**Invited Lecture**  
**Title:** Combining Bio- and Chemo-catalysis to Develop Biobased Chemicals, Polymers and Materials.

**Place/Event:** 248<sup>th</sup> American Chemical Society National Meeting, Fall 2014, San Francisco  
30<sup>th</sup> International Conference of the Polymer Processing Society PPS30, Cleveland, Ohio, USA  
**Date:** March 16-20 2014  
**Invited Lecture**  
**Title:** Building a platform for the efficient synthesis of oligopeptide building blocks for bio-based material applications

**Place/Event:** 248<sup>th</sup> American Chemical Society National Meeting, Fall 2014, San Francisco  
30<sup>th</sup> International Conference of the Polymer Processing Society PPS30, Cleveland, Ohio, USA  
**Date:** March 16-20 2014  
**Invited Lecture**  
**Title:** Polysphorolipids: A promising new family of biomaterials

**Place/Event:** 248<sup>th</sup> American Chemical Society National Meeting, Fall 2014, San Francisco  
30<sup>th</sup> International Conference of the Polymer Processing Society PPS30, Cleveland, Ohio, USA  
**Date:** March 16-20 2014  
**Invited Lecture**  
**Title:** Simplifying alternating peptide synthesis by protease catalyzed dipeptide oligomerization,  
**Place/Event:** 30<sup>th</sup> International Conference of the Polymer Processing Society PPS30, Cleveland, Ohio, USA  
**Date:** June 8-12, 2014  
**Keynote Lecture**  
**Title:** Biotechnologically produced monomers: A unique family of biobased materials from  $\omega$ -hydroxylated fatty acids

**Place/Event:** ISBBB 2014 (13<sup>th</sup> International Symposium on Bioplastics, Biocomposite & Biorefining – Moving Towards a Sustainable Bioeconomy), Guelph, Ontario, CANADA  
**Date:** May 21, 2014  
**Invited Lecture**  
**Title:** Adventures in Entrepreneurship of a University Professor”

**Place/Event:** Dow Advanced Materials, Collegeville, PA  
**Date:** May 15<sup>th</sup> 2014  
**Invited Lecture**  
**Title:** Enzyme Catalysis: Expanding Opportunities in Polymer Science

**Place/Event:** Case Western Reserve University, Cleveland Ohio  
**Date:** April 17<sup>th</sup> 2014  
**Invited Lecture – Colloquium Speaker.**  
**Title:** Enzyme Catalysis: Expanding Opportunities in Polymer Science

**Place/Event:** 30<sup>th</sup> International Conference of the Polymer Processing Society PPS30, Cleveland, Ohio, USA

**Date:** June 8-12, 2014

**Keynote Lecture**

**Title:** Biotechnologically produced monomers: A unique family of biobased materials from  $\omega$ -hydroxylated fatty acids

**Place/Event:** ISBBB 2014 (13<sup>th</sup> International Symposium on Bioplastics, Biocomposite & Biorefining – Moving Towards a Sustainable Bioeconomy), Guelph, Ontario, CANADA

**Date:** May 21, 2014

**Invited Lecture**

**Title:** Adventures in Entrepreneurship of a University Professor”

**Place/Event:** Dow Advanced Materials, Collegeville, PA

**Date:** May 15<sup>th</sup> 2014

**Invited Lecture**

**Title:** Enzyme Catalysis: Expanding Opportunities in Polymer Science

**Place/Event:** Case Western Reserve University, Cleveland Ohio

**Date:** April 17<sup>th</sup> 2014

**Invited Lecture – Colloquium Speaker.**

**Title:** Enzyme Catalysis: Expanding Opportunities in Polymer Science

**Place/Event:** 247<sup>th</sup> ACS National Meeting & Exposition, Dallas, TX, United States

**Date:** March 20<sup>th</sup> 2014

**Invited Lecture.**

**Title:** High Resolution Multipen Lithography on Poly( $\epsilon$ -caprolactone) films using ‘Enzyme Ink’

**Place/Event:** 247<sup>th</sup> ACS National Meeting & Exposition, Dallas, TX, United States

**Date:** March 16<sup>th</sup> 2014

**Invited Lecture.**

**Title:** Biotechnologically produced monomers: a unique family of biobased materials from  $\omega$ -hydroxylated fatty acids

**Place/Event:** 247<sup>th</sup> ACS National Meeting & Exposition, Dallas, TX, United States

**Date:** March 19<sup>th</sup> 2014

**Title:** Simplifying alternating peptide synthesis by protease-catalyzed dipeptide oligomerization

**Place/Event: DuPont Central Research & Development**

**Location: Wilmington,**

**DE Date:** October 4, 2013

**Invited Lecture.**

**Title:** Enzyme Catalysis: Expanding Opportunities in Polymer Science

**Place/Event: Chemical and Biological Defense Program: Enzyme Colloquium and Program Review Location: University of Warwick, UK**

**Date:** October 1-3, 2013

**Invited Lecture.**

**Title:** Enzyme Encapsulation and Microbial Biosurfactants

**Place/Event: 11<sup>th</sup> International Conference on Materials Chemistry (MC11)**

**Location: University of Warwick,**

**UK Date: July 8-11<sup>th</sup>, 2013**

**Keynote Lecture.**

**Title: Chemoenzymatic Routes to Biobased Poly(<sup>ω</sup>-hydroxyfatty acids), Self-Assembling Oligopeptides and Poly(glycolipids).**

**Place/Event: Sustainable Polymers**

**Location: Safety Harbor, Florida,**

**USA Date: May 20-23<sup>rd</sup>, 2013**

**Invited Lecture.**

**Title: Enzymatic Catalysis: An Approach Offering Sustainable Solutions in Polymer Science**

**Place/Event: PIRE: Materials for Renewable Energy Nature's Way – Annual Review**

**Location: Cleveland,**

**Ohio Date: June 27<sup>th</sup>, 2013**

**Invited Lecture.**

**Title: Biobased Materials for Photovoltaics and Wind Turbine Blades**

**Place/Event: World Biotechnology Congress 2013 (Boston, USA)**

**Date: June 3-6, 2013**

**Invited Lecture.**

**Title: Modified Sphorolipids Provide an Exciting Platform for new Product Development in a wide range of Applications**

**Place/Event: DSM (Waalwijk, Netherlands)**

**Date: February 28, 2013**

**Invited Lecture.**

**Title: Expanding opportunities for enzyme-catalysis in polymer science**

**Place/Event: Evonik**

**(Hanau) Date: February 26,**

**2013 Invited Lecture.**

**Title: Expanding opportunities for enzyme-catalysis in polymer science**

**Place/Event: University of Konstanz (Konstanz, Germany)**

**Date: February 25, 2013**

**Invited Lecture.**

**Title: Expanding opportunities for enzyme-catalysis in polymer science**

**Place/Event: Kolloquium Freiberg (Freiberg, Germany)**

**Date: February 21, 2013**

**Invited Lecture.**

**Title: Expanding opportunities for enzyme-catalysis in polymer science**

**Place/Event: Covidien (New Haven, Connecticut)**

**Date: February 18, 2013**

**Invited Lecture.**

**Title: Opportunities for enzymes in biomedical materials.**

**Place/Event: Evonik/Site visits of Center Members Located in Europe**

**Date: October 11<sup>th</sup> 2012, Essen, Germany**

**Invited Lecture.**

**Title:** Enhancing the performance of natural derived biosurfactants.

**Place/Event:** *Novozymes/Site visits of Center Members Located in Europe*

**Date:** October 10<sup>th</sup> 2012, *Bagsvaerd, Denmark*

**Invited Lecture**

**Title:** Cutinases: biocatalysts for polymer synthesis and modification.

**Place/Event:** **Warsaw University of Technology**/European-Materials Research Society (E-MRS)  
2012 FALL MEETING (Warsaw, Poland)

**Date:** September 20 2012

**Invited Lecture**

**Title:** Enzyme-Catalysis: Ever Expanding Role in Polymer Science

**Place/Event:** 244th ACS National Meeting & Exposition, Philadelphia, PA, United States

**Date:** August 19-23 2012

**Title:** Promising results from enzyme-catalyzed polyester synthesis in a microchannel reactor

**Place/Event:** 244th ACS National Meeting & Exposition, Philadelphia, PA, United States

**Date:** August 19-23 2012

**Title:** Next generation bioplastics from  $\omega$ -hydroxyfatty acids: synthesis, physico-mechanical properties and biodegradation.

**Place/Event:** 244th ACS National Meeting & Exposition, Philadelphia, PA, United States

**Date:** August 19-23 2012

**Title:** Efficient enzymatic route to unsaturated poly(glycerol-co-oleic diacid) with linoleic acid side chains.

**Place/Event:** 244th ACS National Meeting & Exposition, Philadelphia, PA, United States

**Date:** August 19-23 2012

**Title:** Writing with enzymes: Creating well-defined patterns and holes in biomaterials

**Place/Event:** IUPAC MACRO2012 World Polymer Congress at Virginia Polytechnic Institute, USA

**Date:** June 25 2012

**Invited Lecture**

**Title:**  $\omega$ -Hydroxyl fatty acid based polymers: biotransformation, polymerization and characterization.

**Place/Event:** S-PolyMat 2012, Rulduc Abbey, Kerkrade, Netherlands

**Date:** May 20-23, 2012

**Invited Lecture**

**Title:** Enzyme-catalysis ever expanding role in polymer science

**Place/Event:** 243rd ACS National Meeting & Exposition, San Diego, CA, United States March 25-29,

**Date:** March 25-29, 2012

**Invited Lecture**

**Title:** Yeast derived bioplastics that fill a gap

**Place/Event:** *Rensselaer Polytechnic Institute (RPI)/Troy, N.Y.*

**Date:** March 20, 2012

**Invited Lecture**

**Title:** Enzyme-Catalysis: Ever Expanding Role in Polymer Science

**Place/Event:** *Rochester Institute of Technology (RIT)/Golisano Institute for Sustainability*

**Date:** March 14<sup>th</sup> 2012

**Invited Lecture**

**Title:** Enzyme-Catalysis: Ever Expanding Role in Polymer Science

**Place/Event:** *Virginia Tech (VT)/Blacksburg, VA*

**Date:** February 29, 2012

**Invited Lecture**

**Title:** Enzyme-Catalysis: Ever Expanding Role in Polymer Science

**Place/Event:** *Innovation Takes Root 2012/Orlando, FL*

**Date:** February 20-22, 2012

**Invited Lecture**

**Title:** Reactive Blending compatibilized Ingeo/poly( $\omega$ -hydroxyfatty acid) blends

**Place/Event:** *PepsiCo/Hawthorne, NY*

**Date:** November 3, 2011

**Invited Lecture**

**Title:** Enzyme-Catalysis: Ever Expanding Role in Polymer Science

**Place/Event:** *Xerox/Xerox Research Center of Canada (XRCC)- Ontario, Canada*

**Date:** October 28, 2011

**Invited Lecture**

**Title:** Enzyme-Catalysis: Ever Expanding Role in Polymer Science

**Place/Event:** *CHEM/Biobased Global Partnering Summit – Houston, TX*

**Date:** October 24-26, 2011

**Invited Lecture**

**Title:** Biobased Poly( $\omega$ -hydroxyfatty acids)

**Place/Event:** *BASF/Ludwigshafen – Germany*

**Date:** October 19, 2011

**Invited Lecture**

**Title:** NSF Center for Biocatalysis at NYU-POLY: Progress Report

Place/Event: *Evonik/ Essen - Germany*

**Date:** October 17, 2011

**Invited Lecture**

**Title:** NSF Center for Biocatalysis at NYU-POLY: Progress Report

Place/Event: *3rd International Conference on Biodegradable and Biobased Polymers –  
Strasbourg France*

**Date:** August 29-31 2011

**Invited Lecture**

**Title:**  $\omega$ -Hydroxyfatty acids: new monomers for a versatile family of biobased polymers

**Place/Event:** *Virginia Commonwealth University/Richmond, Virginia*

**Date:** August 1, 2011

**Invited Lecture**

**Title:** Enzyme-Catalysis: Ever Expanding Role in Polymer Science

**Place/Event:** *International Flavors and Fragrance (IFF)/Union Beach, N.J.*

**Date:** June 2, 2011

**Invited Lecture**

**Title:** **Biocatalysis Center at NYU-POLY – Overview of Research Activities**

**Place/Event:** *Technology Transfer Workshop at NYU organized by Abram M. Goldfinger*

**Date:** May 24, 2011

**Invited Lecture**

**Title:** Launching SyntheZyme

**Place/Event:** *Unilever/Trumbull, CT*

**Date:** May 15, 2011

**Invited Lecture**

**Title:** Modified sphorolipids: Enhancing the properties of natural glycolipids

**Place/Event:** *bioplastek2011, Waldorf Astoria Hotel, New York City*

**Date:** June 27-29 2011

**Invited Lecture**

**Title:** Biobased Plastics: State-of-the-Art

**Place/Event:** **Verdezyne:** *Verdezyne is pioneering green chemistry, leading the shift from a petroleum- based to a biobased economy.*

**Date:** March 2, 2011, *Carlsbad, California*

**Invited Lecture**

**Title:** New Developments in Biobased Plastics

**Place/Event:** **4th Workshop on Fats and Oils as Renewable Feedstock for the Chemical Industry**

**Date:** March 20-22, 2011, *Karlsruhe, Germany*

**Invited Lecture**

**Title:** Engineered Lipids Produced by Microbes and their Use in Biobased Materials

**Place/Event:** **2011 Spring ACS National Meeting**

**Date:** Sunday March 27, 2011 - Thursday March 31, 2011, *Anaheim, California*

**Invited Lecture**

**Title:** Enzyme-catalysis breathes new life into polyester condensation polymerizations

**Place/Event:** **2011 Spring ACS National Meeting**

**Date:** Sunday March 27, 2011 - Thursday March 31, 2011, *Anaheim, California*

**Invited Lecture**

**Title:** Progress report: Developments and opportunities in biobased polymers

**Place/Event:** **2011 Spring ACS National Meeting**

**Date:** Sunday March 27, 2011 - Thursday March 31, 2011, *Anaheim, California*

**Invited Lecture**

**Title:** Peptides the easy way using protease-catalysis

**Place/Event:** **2011 Spring ACS National Meeting**

**Date:** Sunday March 27, 2011 - Thursday March 31, 2011, *Anaheim, California*

**Invited Lecture**

**Title:** Biocatalytic Route to  $\omega$ -Hydroxyfatty acids



**Place/Event:** *2011 Spring ACS National Meeting*

**Date:** Sunday March 27, 2011 - Thursday March 31, 2011, *Anaheim, California*

**Invited Lecture**

**Title:** Biobased poly( $\omega$ -Hydroxyfatty acids): synthesis, physico-mechanical properties and blends

**Place/Event:** *Responsible Conduct of Research Resources: Collaborations with Industry, Conflict of Interest, Data Sharing and Ownership*

**Date:** Thursday May 24, 2011, NYU Kimmel Center, *Manhattan, New York*

**Invited Lecture**

**Title:** A Faculty Member's Perspective and Experiences in Starting a new Company

**Place/Event:** *IFF – International Flavors and Fragrances: As a leading global creator of flavors and fragrances used in a wide variety of consumer products, millions of consumers around the world enjoy our products on a daily basis without ever knowing that we are a key component to that unique scent and taste experience they love.*

**Date:** June 2, 2011, *Union Beach, New Jersey*

**Invited Lecture**

**Title:** Biobased Ingredients for Food and Fragrances

**Place/Event:** *Bioplastek 2011*

**Date:** June 27-29, 2011 Waldorf Astoria, *Manhattan, New York*

**Invited Lecture**

**Title:** Biobased Plastics: State-of-the-Art

**Place/Event:** *BIOPOL 2011: 3<sup>rd</sup> International Conference on Biodegradable and Biobased Polymers*

**Date:** August 29-31, 2011, *at ECPM, University of Strasbourg, France.*

**Invited Lecture**

**Title:**  $\omega$ -Hydroxyfatty Acids: New Monomers for a Versatile Family of Biobased Polymers

**Place/Event:** *14th International Biotechnology Symposium and Exhibition*

Biotechnology for the Sustainability of Human Society

**Date:** 14-18 September 2010, Palacongressi, *Rimini –*

**Italy Invited Lecture**

**Title:** Engineering *Candida tropicalis* for conversions of fatty acids to  $\omega$ -hydroxyfatty acids: monomers for next generation bioplastics

**Place/Event:** *ISBP 2010: International Symposium on Biopolymers*

**Date:** October 3-7, 2010, *Stuttgart,*

**Germany Invited Lecture**

**Title:** PHA Precursors, New Platform Chemical and Biobased Monomers

**Place/Event:** *Covidien: \$10 billion global healthcare products leader dedicated to innovation and long-term growth. Covidien creates innovative medical solutions for better patient outcomes and delivers value through clinical leadership and excellence.*

**Date:** November 15, 2010, *New Haven, Connecticut*

**Invited Lecture**

**Title:** Biocatalytic Routes to Biomedical Materials

**Place/Event:** *8th Euro Fed Lipid Congress, "Oils, Fats and Lipids: Health & Nutrition, Chemistry & Energy",*

**Date:** November 21-24, 2010, *Munich, Germany*

**Invited Lecture:** Engineered Lipids Produced by Microbes and their Use in Biobased Materials

**Place/Event:** AQUITAINE CONFERENCE POLYMERS (Arcachon, France)

**Date:** October 13-16, 2009

**Invited Lecture**

**Title:** “New Cell-Free Enzyme-Catalyzed Polymer Technology Platforms: Polyol-Polyesters, Polyethylene-Like Materials from Fatty Acids, and Powerful Hydrolases for Polyester Degradation”

**Place/Event:** ENZYME ENGINEERING XX

**Date:** September 20-24, 2009

**Invited Lecture**

**Title:** “Engineering *Candida tropicalis* for Conversions of Fatty Acids to  $\omega$ -Hydroxy Fatty Acids”

**Place/Event:** ACS National meeting (Washington, D.C.) Meeting, August 2009

**Date:** August 2009

**Tutorial Lecture**

**Title:** “Overview: recent developments and opportunities in biobased polymers”

**Place/Event:** ACS National meeting (Washington, D.C.) Meeting, August 2009

**Date:** August 2009

**Oral presentation**

**Title:** “Glycolipid biomaterials: Synthesis and solid-state properties of a poly(sophorolipid)”

**Place/Event:** ACS National meeting (Washington, D.C.) Meeting, August 2009

**Date:** August 2009

**Oral presentation**

**Title:** “Surprisingly rapid enzymatic hydrolysis of poly(ethylene terephthalate)”

**Place/Event:** ACS National meeting (Washington, D.C.) Meeting, August 2009

**Date:** August 2009

**Oral presentation**

**Title:** “Lipase-catalysis provides an attractive route for poly(carbonate-co-esters) synthesis”

**Place/Event:** 42<sup>nd</sup> Silicone Symposium, Long Branch, New Jersey.

**Date:** June 11 2009

**Plenary Lecture**

**Title:** “Mild Lipase-Catalyzed Routes to Silicone-Sugar Conjugates, Silicone Polyesters and Polyamides”

**Place/Event:** Dial

Henkel **Date:** February

2009 **Invited Lecture**

**Title:** “Biocatalytic Routes to Bio-based Chemicals”

**Place/Event:**

Lubrizol **Date:**

February 2009

**Invited Lecture**

**Title:** “Renewable Resource Bioconversions to Chemicals of Industrial Importance”

**Place/Event:** University of Minnesota Industrial Partnership For Research in Interfacial and Materials Engineering Event:

**Date:** May 26 - May 28, 2009

**Invited Lecture**

**Title:** “New Biobased Materials from  $\omega$ -hydroxyfatty acids and polyol-polyesters”

**Place/Event:** American Society for Microbiology 2009 annual meeting

**Date:** May 17-21 2009

**Invited Lecture**

**Title:** “Engineering *Candida tropicalis* for conversions of fatty acids to hydroxyfatty acid monomers and their cell-free lipase catalyzed polymerization to polyethylene-like materials”

**Place/Event:** 90<sup>th</sup> Birthday Celebration, Manachem Lewin

**Date:** November 5 2008

**Invited Lecture**

**Title:** “Bio-oxidation of Fatty Acids to Prepare Biobased Polyethylene-like Polyesters and powerful PET degrading enzymes”

**Place/Event:** American Oil Chemical Society Meeting, Cincinnati  
Industrial Applications of Renewable Resources conference

**Date:** October 16 2008

**Invited Lecture**

**Title:** “Overview: Recent Developments and Opportunities in Biobased Polymers”

**Place/Event:** International Symposium on Polymers and the Environment: Emerging Technology and Science (Nashua, NH)

**Date:** October 7–10 2008

**Plenary Lecture**

**Title:** “New enzyme-catalyzed polymer technology platforms: polyethylene-like biobased polyesters and cutinase-catalyzed polymer modification”

**Place/Event:** ADM (Archer Daniels Midland)

**Date:** September 08

**Invited Lecture**

**Title:** “Renewable Resource Bioconversions to Chemicals Of Industrial Importance”

**Place/Event:** “POLY 2008” Biennial Commercial Innovations and Opportunities in Polymer Science (Galveston, Texas) May 4-7, 2008

**Date:** May 4-7, 2008

**Invited Lecture**

**Title:** “Biocatalytic Routes to Bio-based Chemicals”

**Place/Event:** Brazil Chemical Society Annual meeting (Águas de Lindóia, SP, Brazil)

**Date:** March 26, 2008

**Plenary Lecture**

**Title:** “Biocatalytic Routes to Bio-based Chemicals”

**Place/Event:** International Society for Biopolyesters (ISBP) at SKYCITY, Auckland Convention Centre, New Zealand.

**Date:** November 23-26 2008

**Plenary Lecture**

**Title:** “New Cell-Free Enzyme-Catalyzed Polymer Technology Platforms: Polyol-Polyesters, Polyethylene-Like Materials From Fatty Acids, And Powerful Hydrolases For Polyester Degradation”

## CURRENT RESEARCH FUNDING

Over the past 10 years my research group has had on average 12 Ph.D. students, 5 Masters, 10 undergraduates and 6 high school students. Annual funding generally ranges from 500,000 to 1.5 Million.

## EDUCATIONAL AND OUTREACH ACTIVITIES

### **Student training:**

*PI's group is structured to educate students at different levels of academic and laboratory skill sets: Research group is structure so that Ph.D. students interact with undergraduate (UG), High School and 3<sup>rd</sup> to 7<sup>th</sup> graders, the latter through our collaboration with the Kids Science Challenge (see below). Group research is organized to provide different experiences to students at varying levels of academic and laboratory skill sets. For example, high school students work on well-defined tasks such as protein synthesis by fermentation, protein purification, assays of protein activity, monomer synthesis or polyester synthesis. High school student work in groups of three teamed with at least one undergraduate and Ph.D. student. More advanced undergraduate and graduate students are assigned to project tasks of broader scope and that require their use of problem solving skills. The rationale for developing these teams is further elaborated below.*

**Developing communication skills and an appreciation for working in teams:** Organization into teams accomplishes two important tasks: i) knowledge transfers between students at different levels and ii) simulates today's workplace that increasingly builds interdisciplinary teams to solve complex problems. In this way, students in the PI's lab gain an understanding and appreciation of *high-level teamwork*. Research in the Gross group fits perfectly into the above approach of creating interdisciplinary teams since the program involves interdisciplinary skills (e.g. chemistry, microbiology, biochemistry, material science, polymer physics).

**Support and encouragement of high school research experiences:** The Gross group has a long history for running intensive summer research programs for high school students. The program seeks to provide HS students with a research experience in state-of-the-art research laboratories. This is critically important so they gain some understanding of what a career in research involves. Annually, the Gross group admits 6- 10 HS students that work in teams with undergraduate and Ph.D. students generating research results that they use to enter various state and national science and engineering competitions.

**Creating a new module on the Kids Science Challenge (<http://www.kidsciencechallenge.com/>):** Gross is working with the Jim Metzner and his team at the Kids Science Challenge to create a new module aimed at 3<sup>rd</sup> to 6<sup>th</sup> graders to teach about "magic microbes". The module takes a fun approach at getting kids excited about science by focusing on all the important things that microbes do in their everyday life to make their world a better place. Furthermore, games and simple experiments students can try at home will be posted on the web-site. The kids receive a kit with materials they can investigate, such as a biodegradable plastic that can be studied in different ways to learn about how it decomposes in nature. The new module is now available on the web <http://www.kidsciencechallenge.com/#/3a>

**Invention, Innovation and Entrepreneurship (i<sup>2</sup>E): Serving as Chief Technical officer of SyntheZyme, a spin out company from NYU-POLY:** SyntheZyme, a privately held sustainable chemical company located in Rensselaer, NY, is commercializing the technology developed in the laboratories of Professor Richard A. Gross. Dr. Gross is a Constellation Chair of Biocatalysis and Metabolic Engineering in RPI's Center for Interdisciplinary Science. SyntheZyme's business model is to focus on innovation and technology development while working with commercialization partners that have existing market channels, customer intimacy, application development, existing scale-up and commercial manufacturing

capabilities. SyntheZyme uses its deep understanding of Biocatalysis to replace petrochemical based industrial chemicals with biobased and biodegradable alternatives. Examples of applications areas for SyntheZyme technologies include biochemicals for plastics, pesticides, cosmetics and personal careproduct ingredients.

**Creating a new module on the Kids Science Challenge (<http://www.kidsciencechallenge.com/>):**

Gross worked with Jim Metzner and his team at the *Kids Science Challenge* to create a new module aimed at 3<sup>rd</sup> to 6<sup>th</sup> graders to teach about “magic microbes”. The module takes a fun approach at getting kids excited about science by focusing on all the important things that microbes do in their everyday lifeto make their world a better place. Furthermore, games and simple experiments students can try at home will be posted on the web-site. The kids receive a kit with materials they can investigate, such as a biodegradable plastic that can be studied in different ways to learn about how it decomposes in nature.

**UNIVERSITY COMMITTEES**

*I currently serve on the following Institutional RPI Committees*

- Center for Biotechnology and Interdisciplinary Sciences (CBIS) Executive Committee
- Graduate Standards and Curriculum Committee (Chemistry Dept.)
- Vision Committee (Chemistry Dept.)

**CURRENT TEACHING RESPONSIBILITIES**

One course per semester:

NATURAL POLYMERS & BIOMATERIAL

BIOCATALYSIS: FUNDAMENTALS AND

APPLICATIONS