

Jonathan Konstantine Sakkos

MECHANICAL ENGINEER

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Education

University of Minnesota

Minneapolis, MN

PH.D. IN MECHANICAL ENGINEERING

2012 – 2018

- Advisor: Alptekin Aksan, Ph.D.
- Co-advisor: Lawrence P. Wackett, Ph.D.
- Thesis: “Engineering Biocatalytic Materials: Encapsulation Systems for Biotechnology”

University of Portland

Portland, OR

B.S. IN MECHANICAL ENGINEERING

2005-2009

Skills

Field Expertise	Biointerfaces, Bioencapsulation, Sol-Gel Synthesis, Polymeric Biomaterials, Material Characterization
Characterization Techniques	SEM, FTIR, GC-MS, UV-Vis Spectroscopy, Confocal Microscopy, Mechanical Testing, Contact Angle
Software	Matlab, Python, LaTeX, SolidWorks, AutoCAD

Publications

PEER-REVIEWED JOURNAL ARTICLES

1. **J.K. Sakkos**, D.P. Kieffer, B.R. Mutlu, L.P. Wackett, A. Aksan. Engineering of a Silica Encapsulation Platform for Hydrocarbon Degradation Using *Pseudomonas* sp. NCIB 9816-4. *Biotechnology and Bioengineering* 2015, 113 (3), 513–521.
2. B.R. Mutlu, **J.K. Sakkos**, S. Yeom, L.P. Wackett, A. Aksan. Silica ecosystem for synergistic biotransformation. *Scientific Reports* 2016, 6, 27404.
3. **J.K. Sakkos**, B.R. Mutlu, L.P. Wackett, A. Aksan. Adsorption and biodegradation of aromatic chemicals by bacteria encapsulated in a hydrophobic silica gel. *ACS Applied Materials & Interfaces* 2017, 9 (32), 26848-26858.
4. J.J. Benson, **J.K. Sakkos**, L.P. Wackett, A. Aksan. Enhanced biodegradation of atrazine by bacteria encapsulated in organically modified silica gel. *Journal of Colloid and Interface Science* 2018, 510, 57–68.
5. K. Zhu, W. A. Arnold, **J.K. Sakkos**, C. Davis, P.J. Novak, Achieving high-rate hydrogen recovery from wastewater using customizable alginate polymer gel matrices encapsulating biomass. *Environmental Science: Water Research & Technology* 2018, 4 (11), 1867-1876.
6. **J.K. Sakkos**, L.P. Wackett, A. Aksan, Designing microbial exoskeleton for enhanced biocatalyst reactivity. *Scientific Reports* 2019, 9, 3158.
7. M. Schwab, C. Bergonzi, **J.K. Sakkos**, C. Staley, Q. Zhang, M.J. Sadowsky, A. Aksan, M. Elias, Signal Disruption Leads to Bacterial Biofilm Inhibition and Changes in Biofilm and Suspension Communities. *Frontiers in microbiology* 2019, 10,1-13.
8. E.J. Young, **J.K. Sakkos**, J. Huang, *et al.*, Visualizing in Vivo Dynamics of Designer Nanoscaffolds. *Nano Letters* (2019).

CONFERENCE PROCEEDINGS

1. **J.K. Sakkos**, D.P. Kieffer, B.R. Mutlu, L.P. Wackett, A. Aksan “Design of Porous Silica Gels for Bioremediation of Aromatic Hydrocarbons” *Northeast Bioengineering Conference*, Troy, NY, USA, 2015.

MANUSCRIPTS IN PREPARATION

1. **J.K. Sakkos**, J. Huang, S. Hernandez-Ortiz, *et al.*, Orthogonal decon system for controlled protein degradation in cyanobacteria.

PUBLIC OUTREACH

1. **J.K. Sakkos**, r/Science. “Science AMA Series: I’m Jonathan Sakkos, a graduate student in mechanical engineering at the University of Minnesota. I trap bacteria within porous materials for cleaning pollutants from water. AMA!” *The Winnower* 2016.

Patents

1. A. Radian, B.R. Mutlu, **J.K. Sakkos**, A. Aksan, L.P. Wackett, 2015, “*Compositions Including A Silica Matrix And Biomaterial, Methods Regarding The Same And Uses Thereof*,” U.S. Patent Application Number 14/883,053
2. L.P. Wackett, A. Aksan, **J.K. Sakkos**, T. Dodge, 2017, “*Cyanuric Acid Remediation*,” U.S. Patent Application Number 62/486,491
3. **J.K. Sakkos**, L.P. Wackett, A. Aksan, 2018, “*Biological Assembly Including Biological Component and Shield*”, Provisional Patent Filed

Honors & Awards

- 2017 **Joachim and Yuko Heberlein Award**, Department of Mechanical Engineering, University of Minnesota *Minneapolis, MN*
- 2015 **BioTechnology Institute Travel Award**, University of Minnesota *Minneapolis, MN*
- 2012 **Fellowship**, Department of Mechanical Engineering, University of Minnesota *Minneapolis, MN*
- 2008-2009 **Dean's List**, University of Portland *Portland, OR*
- 2005-2009 **President's Scholarship**, University of Portland *Portland, OR*

Invited Talks

1. **University of Michigan**, Ann Arbor, MI: “Engineering Biocatalytic Materials: Encapsulation Systems for Biotechnology” 2018

Conference Presentations

11th European Workshop on the Biology of Cyanobacteria

Porto, Portugal

ORAL PRESENTATION

2020

- **J.K. Sakkos**, J. Huang, S. Hernandez-Ortiz, *et al.*, Orthogonal degron system for controlled protein degradation in cyanobacteria.

5th International Conference on Multifunctional, Hybrid and Nanomaterials

Lisbon, Portugal

POSTER PRESENTATION

2017

- **J. K. Sakkos**, B.R. Mutlu, L. P. Wackett, A. Aksan “Bioregeneration of Ormosil gel for remediation of PAHs from water”
- **J. K. Sakkos**, B.R. Mutlu, L. P. Wackett, A. Aksan “Engineering of a Silica Encapsulation Platform for Hydrocarbon Degradation using *Pseudomonas* sp. NCIB 9816”

Summer Biomechanics, Bioengineering, and Biotransport Conference

National Harbor, MD

POSTER PRESENTATION

2016

- **J. K. Sakkos**, L. P. Wackett, A. Aksan “Microbial Regeneration of Adsorbent Silica Gel for Sustainable Treatment of Environmental Pollutants”
- G. Heo, **J. K. Sakkos**, S. Yeom, L. P. Wackett, A. Aksan “Bacterial Growth Inside Reversible Ca-alginate Beads Encapsulated in a Thin Silica Film”

University of Minnesota MnDRIVE Environment Symposium

Minneapolis, MN

POSTER PRESENTATION

2016

- B. R. Mutlu, **J. K. Sakkos**, S. Yeom, L. P. Wackett, A. Aksan “Silica ecosystem for synergistic biotransformation”

Materials Research Society Fall Meeting

Boston, MA

POSTER PRESENTATION

2015

- **J. K. Sakkos**, D. P. Kieffer, B.R. Mutlu, L. P. Wackett, A. Aksan “Organic Modification of Silica Gels with Encapsulated *Pseudomonas* sp. NCIB 9816 for Enhanced Biodegradation of Aromatic Hydrocarbons”

Battelle Bioremediation Symposium

Miami, FL

PLATFORM TALK

2015

- **J. K. Sakkos**, D. P. Kieffer, B.R. Mutlu, L. P. Wackett, A. Aksan, “Design of Porous Silica Gels for Biodegradation of Aromatic Hydrocarbons”

Northeast Bioengineering Conference

Troy, NY

PLATFORM TALK

2015

- **J. K. Sakkos**, D. P. Kieffer, B.R. Mutlu, L. P. Wackett, A. Aksan “Design of Porous Silica Gels for Biodegradation of Aromatic Hydrocarbons”

Experience

Postdoctoral Research Associate

East Lansing, MI

DUCAT LAB - MICHIGAN STATE UNIVERSITY

2018-present

- Developed a tunable protein degradation system in cyanobacteria
- Studying a light-driven, modular platform consortia for fundamental insight into emergent microbial interactions within consortia

Research Assistant

Minneapolis, MN

BIOENCAPSULATION LAB - UNIVERSITY OF MINNESOTA

2012-2018

- Studied bioencapsulation (physical confinement) of bacteria for applications in biotechnology
- Synthesized new porous materials for bioencapsulation
- Performed materials characterization on novel materials

Teaching Assistant

Minneapolis, MN

MECHANICAL ENGINEERING DEPARTMENT - UNIVERSITY OF MINNESOTA

Spring 2018

- ME 3331 - Thermodynamics

Product Engineer

Portland, OR

COLUMBIA STEEL CASTING CO.

2009-2012

- Designed replacement wear parts for heavy scrap shredders
- Modeled parts and assemblies in SolidWorks, created 2D drawings in AutoCAD
- Coordinated part design with pattern shop and foundry to avoid production issues
- Redesigned parts to ensure better performance, longer life
- Played a major role in the product development process, from Engineering Request all the way up to quoting and sales
- Coordinated with salesmen in order to provide the best possible service to our customers

Product Engineer-Intern

Portland, OR

COLUMBIA STEEL CASTING CO.

2007-2009

- Worked with an Engineer on various projects
- Designed replacement wear parts for heavy scrap shredders. Modeled parts and assemblies in SolidWorks, created 2D drawings in AutoCAD

Engineering Tech. I

Santa Rosa, CA

COUNTY OF SONOMA

May. 2006 - Aug. 2006

- Performed materials testing. Field and laboratory tests included: compaction, sand equivalent, gradation, in place density, moisture content

Graduate Rotation Students Mentored (8 weeks each) _____

Joshua Kaste January - February 2020 Serena Lotreck November - December 2019 Nick Schlecht September - October 2019 Sergio Hernandez-Ortiz July - August 2019

Undergraduate Students Mentored _____

Kam Kenicott April 2019 - present Ezgi Evcik May 2018 - Sept. 2018 Meera Harihara Jan. 2016 - July 2016 Daniel P. Kieffer Dec. 2013 - Dec. 2015 Amanda Eidem Jan. 2013 - Jan. 2014 James Bienieck Sept. 2013 - June 2014 Kanav Khosla Jan. 2013 - May 2013