

**Clayton S. Jeffryes**  
**Associate Professor**  
Dan F. Smith Department of Chemical Engineering  
Lamar University  
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<http://orcid.org/0000-0002-5451-2007>

### ***Research Positions***

2021 – Associate Professor, Dan F. Smith Department of Chemical & Biomolecular Engineering, Lamar University  
2015 –2021 Assistant Professor, Dan F. Smith Department of Chemical & Biomolecular Engineering, Lamar University  
2012 – 15 Research Fellow, Chargé de Recherches FNRS (Belgian National Science Foundation)  
2009 – 12 Post-Doctoral Researcher, Catholic University of Louvain (marine biotechnology and engineering)  
2004 – 09 Graduate Research Assistant, Ph.D., Oregon State University (nanobiotechnology)  
2003 – 04 Graduate Research Assistant, MS, Oregon State University (algal bioprocess engineering)  
2001 Undergraduate Research Assistant, Oregon State University, Bioengineering (protein separation)

### ***Education – Degrees***

2009 Ph.D. Chemical Engineering, Oregon State University, May 26, 2009. Title: Biological insertion of nanostructured germanium and titanium oxides into diatom biosilica.  
Permanent link: <http://hdl.handle.net/1957/12005>, Advisor: Prof. Gregory Rorrer  
Research focus: Bioprocess strategies for the fabrication and characterization of hierarchically structured metal oxide alloys and composites based on marine algal nanobiotechnology  
2004 M.S. Chemical Engineering, Oregon State University  
2002 B.S. BioEngineering (Dept. of Chemical, Biological and Environmental Engr.), Oregon State University

**ORCID:** <https://orcid.org/0000-0002-5451-2007> (55 Works)

**Google Scholar Statistics** <http://scholar.google.be/citations?user=2wtMf70AAAAJ&hl=en>

Peer-reviewed first author publications: 9      Peer-reviewed corresponding author publications: 16      Citations: 2184      H-index: 26

***Peer Reviewed Publications in Internationally Recognized Journals***

44. Yanchatuna Aguayo, O.P., Mouheb, L. Villota Revelo, K., Vasquez-Ucho, P.A., Pawar, P.P., Rahman, A., Jeffryes, C., Terencio, T., Dahoumane, S.A. "Biogenic sulfur-based chalcogenide nanocrystals: methods of fabrication, mechanistic aspects, and bio-applications." *Molecules*. 27, 458 (2022).
43. Jara, N, Milan, N.S., Rahman, A., Mouheb, L., Boffito, D.C., Jeffryes, C., Dahoumane, S.A. "Photochemical synthesis of gold and silver nanoparticles – a review." *Molecules* 26, 4585. (2021).
42. Zambonino, M., Quizhpe, E.M., Jaramillo, F.E., Rahman, A., Vispo, N.S., Jeffryes, C., Dahoumane, S.A. "Green synthesis of selenium and tellurium nanoparticles: current trends, biological properties and biomedical applications." *International Journal of Molecular Sciences* 22, 989 (2021).
41. Rahman, A., Lin, J., Jaramillo, F.E., Bazylnski, D.A., Jeffryes, C., Dahoumane, S.A. "In Vivo biosynthesis of inorganic nanomaterials using eukaryotes – a review." *Molecules* 25, 3246 (2020)
40. Jeffryes, C., Dahoumane, S.A. "Biogenic Nanomaterials: Versatility and Applications!" *Molecules* 25, 9 (2020).
39. Doan, L., Lu, Y., Karatela, M., Phan, V., Jeffryes, C., Benson, T., Wujcik, E.K. "Surface modifications of superparamagnetic iron oxide nanoparticles with polylactic acid-polyethylene glycol diblock copolymer and graphene oxide for a protein delivery vehicle." *Engineered Science* 10-16 (2019).
38. Rahman, A., Kumar, S., Bafana, A., Lin, J., Dahoumane, S.A., Jeffryes, C. (Corresponding Author) "A mechanistic view of the light-induced synthesis of silver nanoparticles using extracellular polymeric substances of *Chlamydomonas reinhardtii*" *Molecules* 24, 3506 (2019)
37. Kumar, S.V., Bafana, A., Pawar, P., Faltane, M., Rahman, A., Dahoumane, S.A., Kucknoor, A., Jeffryes, C. (Corresponding Author) "Optimized production of antibacterial copper oxide nanoparticles in a microwave-

31. Kumar, S.V., Bafana, A.P., Pawar, P., Rahman, A., Dahoumane, S.A., Jeffryes, C. (Corresponding



7. **Jeffryes, C.**, Gutu, T., Jiao, J., Rorrer, G.L. "Peptide-Mediated Deposition of Nanostructured TiO<sub>2</sub> into the Periodic Structure of Diatom Biosilica." **Journal of Materials Research**, **22**, 3255-3262 (2008).
6. **Jeffryes, C.**, Solanki, R., Rangineni, Y., Wang, W., Chang, C.-H., Rorrer, G.L. "Electroluminescence and Photoluminescence from Diatom Frustules Containing Metabolically Inserted Germanium." **Advanced Materials**, **20**, 2633-2637 (2008). Featured article in: Materials Science: Diatomic Power. **Nature Research Highlights**, **453**, 1146 (2008).
5. **Jeffryes C.**, Gutu, T., Jiao, J., Rorrer, G. L. "Two-Stage Photobioreactor Process for the Metabolic Insertion of Nanostructured Germanium into the Silica Microstructure of the Diatom *Pinnularia* sp." **Materials Science & Engineering, C: Biomimetic and Supramolecular Systems**, **28**, 103-118 (2008).
4. Lee, D.-H, Wang, W., Gutu, T., **Jeffryes, C.**, Rorrer, G.L., Jiao, J., Chang, C.-H. "Biogenic silica based Zn<sub>2</sub>SiO<sub>4</sub>:Mn<sup>2+</sup> and Y<sub>2</sub>SiO<sub>5</sub>:Eu<sup>3+</sup> phosphor layers patterned by ink-jet printing process." **Journal of Materials Chemistry**, **18**, 3633-3635 (2008).
3. Lee, D.-H., Gutu, T., **Jeffryes, C.**, Rorrer, G. L., Jiao, J., Chang, C.-H. "

4. Gutu, T.,

1. PhD Dissertation Co-Adviser, "Production of high value-

5. MS Thesis, "Characterization of a novel, internally illuminated airlift photobioreactor." SEVERI, Veronica. Catholic University of Louvain and University of Bologna, Bologna, Italy. Completed March 2014.

4. MS Thesis (co-supervision), "Design and testing of a flat panel airlift photobioreactor." STAMATO, Marissa. Catholic University of Louvain and University of Bologna, Bologna, Italy. Completed August 2013.

3. MS Thesis, "Continuous cultivation of *Ochotodes secundiramea* in photobioreactors." URBAIN, Brieuc. Catholic University of Louvain. Completed August 2012.

2. MS Thesis, "Optimized production of high-value carotenoids by the mixotrophic cultivation of *Haematococcus pluvialis* and *Scenedesmus obliquus* using biodiesel waste glycerol as a carbon source." CHRISTIANE, Diego. Catholic University of Louvain. Completed June 2011.

1. MS Thesis, "Study of the production conditions and industrial commercialization of astaxanthin from the algae *Haematococcus pluvialis* by airlift helical coil photobioreactors with the aim of creating a UCL spin-off." STAS, Sebastien. Catholic University of Louvain. Completed August 2010.



1. Fermentation Science and Engineering Graduate Certificate Program. 2021 -

### **Courses Taught**

11. Applied Bioprocess and Fermentation Laboratory, CHEN 5389 (tba)

10. Applied Bioprocess and Fermentation Engineering, CHEN 5379 (Sp 21, Sp 22)

9. Thermodynamics I, Lamar University CHEN 2374 (Sp 18, Sp 19, Sp 20, Su 20)

8. Undergraduate Professional Seminar, Lamar University CHEN 2140 (Sp 18, F 18, F 19)

7. Momentum Transfer, Lamar University CHEN3311 (Su 16, F 16, Su 17, F 17, Su 18, F 18, Su 19, F 19, Su 20, F 20, Su 21, F 21, S 22)

6. Graduate Transport Phenomena CHEN5302 (Su 17, Sp 19, Sp 20).

5. Heat Transfer, Lamar University CHEN3320 (Sp 16, Sp 17, Su 18)

4. Graduate Mass Transfer, Lamar University CHEN6301 (F 15)

3. Chemical Engineering Project and Industrial Design (LBIRC2201). Université catholique de Louvain, fall semester, 2014. (Equivalent to Capstone Project in the USA)

02.

10. Prospective commercialization of a low-cost, chemical-free antibacterial wipe. Center for Innovation, Commercialization and Entrepreneurship.

17. Kaabipour, S., Lin, J. **Jeffryes, C. (Corresponding)**. "Optimization of microalgal oxygen evolution within planar cultivation systems." 2018 AIChE Annual Meeting, Presentation 68c, Pittsburgh, PA, USA, Oct. 29, 2018.

16. Rahman, A., Nemade, T., Kumar. S.V., Bafana, A., Dahoumane, S.A., **Jeffryes, C. (Corresponding)**.

3. Jeffryes, C. (speaker)

10. Ooi, Z.W., Bafana, A., Kumar, S., **Jeffryes, C.** "Biosynthesis of colloidal stabilizing agents for nanotechnology" 2018 AIChE Annual Meeting, Poster , Pittsburgh, PA, USA, Oct. 29, 2018.

9. Pawar, P.P., Kumar, S.V., Bafana, A., Rahman, A., Dahoumane, **Jeffryes, C.** "Green synthesis of copper oxide nanoparticles using a simple microwave-assisted method." 2017 AIChE Annual Meeting, Mineapolis, Oct 30, 2017, Poster 198m.

8. Mai, T.-N., Rahman, A., Lin, J., Kumar, S.V., Dahoumane, **Jeffryes, C.** "Kinetics of silver cation diffusion across an algal cell wall during silver nanoparticle biosynthesis." 2017 AIChE Annual Meeting, Mineapolis, Oct 30, 2017, Poster 1910.

7. Kumar, S.V., Rahman, A., Rorrer, G., Mai, T.-N., **Jeffryes, C.** "Wastewater treatment using field deployable macroalgal tissue culture." 2016 AIChE Annual Meeting, San Francisco, Nov 14, 2016, Poster 228an.

6. Rahman, A., Kumar, S.V., Kare, A., Dahoumane, S.A., Mai, T.-N., **Jeffryes, C.** "Production and kinetics of metallic nanoparticles from phototrophic cell culture." 2016 AIChE Annual Meeting, San Francisco, Nov 14, 2016, Poster 228v.

5. **Jeffryes, C.**, Grama, B.S., Chader, S., Agathos, S.N. "Biotechnology of Phototrophs – From Metabolic Understanding to Scalable and Energy-Efficient Photobioreactors," 2015 AIChE Annual Meeting. Nov 8-13, 2015, Salt Lake City, Poster 435199, Session 620a.

4. Grama, B.S., Chader, S., ~~Kheifi, D., Agathos, S.N., Ngilfi, "82)-cB~~ 0 9 1 7 ( o ) 3 r ( e ) -

14. Chader, S., Grama, B.S., Kasbadji, N., Saggai, A., **Jeffryes, C.**, Agathos, S.N. "Energy and Environmental Value of Some Microalgae Strains Isolated from the Algerian Sahara." EMBS 2014 – Euromediterranean Microalgal and Biotechnology Seminar. Almeria, Spain. October 20-24, 2014.
13. Grama, B.S., Chader, S., Khelifi, D., **Jeffryes, C.**, Agathos, S. "Canthaxanthin Production in a **Dactylococcus** microalga from the Algerian Sahara." 2013 AIChE Annual Meeting, San Francisco, California, USA, Nov 3-8, Presentation 401f.
12. Rorrer, G.L. (speaker), Rosenburger, J., **Jeffryes, C.** "Two-Stage Photobioreactor Cultivation for Enhancing Lipid Production from Diatom Cells by Controlled Silicon Limitation". 2012 Algal Biomass Summit. Denver, Colorado, USA, Sept 23-27, 2012.
11. Li, J. (speaker), Stamato, M., **Jeffryes, C.**, DeMarche, P., Nair, R., Bouhaja, E., Junghanns, C., Agathos, S. "Design, characterization and cultivation of microalgae in an airlift flat panel photobioreactor. 8<sup>th</sup> Asia-Pacific Conference on Algal Biotechnology. Adelaide, Australia, July 10, 2012.
10. **Jeffryes, C.**, Gutu, T., Li, H., Jiao, J., Rorrer, G.L. (speaker). "Peptide-Mediated Deposition of Nanostructured TiO<sub>2</sub> into the Periodic Structure of Diatom Biosilica and its Integration into the Fabrication of a Dye-Sensitized Solar Cell Device." 2009 Spring Meeting of the Materials Research Society (MRS), Paper MM2.5, Symposium MM: Synthesis of Bio-inspired Hierarchical Soft and Hybrid Materials, San Francisco, CA, April 14, 2009.
9. Rorrer, G.L. (speaker), **Jeffryes, C.**, Gutu, T., Jiao, J. "Peptide-Mediated Deposition of Nanostructured TiO<sub>2</sub> into the Periodic Structure of Diatom Biosilica for Solar Cell Applications." Fall 2008 National Meeting of the American Institute of Chemical Engineers (AIChE), Paper #122c, Session on Templated Assembly of Inorganic Nanomaterials, Philadelphia, PA, Nov. 17, 2008.
8. Rorrer, G.L. (speaker), **Jeffryes, C.**, Chang, C.-H., Lee, D.-H., Gutu, T., Jiao, J., Solanki, R. "Biological Fabrication of Nanostructured Silicon-Germanium Photonic Crystals Possessing Unique Photoluminescent and Electroluminescent Properties." SPIE Optics + Photonics 2007, Conference 6645, Nanoengineering: Fabrication, Properties, Optics, and Devices IV, Paper 6645-09, Session 2, Nano-Biotechnology, San Diego, CA, Aug. 28, 2007.
7. Rorrer, G.L. (speaker), **Jeffryes, C.**, Chang, C.-H., Qin, T., Gutu, T., Jiao, J., Solanki, R. "Biological Fabrication of Nanostructured Silicon-Germanium Materials Possessing Unique Photoluminescent and Electroluminescent Properties." 234th National Meeting of the American Chemical Society (ACS), BIOT Division, Paper #54, Session on Emerging Technologies in Nanobiotechnology, Boston, MA, Aug. 19, 2007.
6. Rorrer, G.L. (speaker), **Jeffryes, C.**, Qin, T., Gutu, T., Jiao, J., Solanki, R., Chang, C.-H. "Cell Culture Process for the Supramolecular Assembly of Nanostructured Silicon-Germanium Oxide Semiconductor Materials." NanoBio 2007, Second International Congress of Nanobiotechnology & Nanomedicine, San Francisco, CA, June 19th, 2007.
5. Rorrer, G.L. (speaker), Chang, C.-H., **Jeffryes, C.**, Qin, T., Jiao, J., Gutu, T. "Biological Fabrication of Metal Oxide Nanostructures Possessing Novel Optoelectronic Properties." Session (638) Supramolecular Assembly of Inorganic Materials I, 2006 AIChE Annual Meeting, San Francisco, CA, Nov 17, 2006.

3. Lee, D.-H., **Jeffryes, C.**, Qin, T., Rorrer, G.L., Chang, C.-H. Fabrication of Luminescent Materials using Biogenic Nanostructured Oxides from Marine Diatoms, T4.9, Symposium T: Nanomanufacturing, Materials Research Society 2006 Spring Meeting, San Francisco CA, April 19, 2006.
2. Rorrer, G.L. (keynote speaker), Chang, C.-H., **Jeffryes, C.**, Liu, S.-H., Qin, T., and Jiao, J. "Whole-cell Biosynthesis of Nanostructured Semiconductor Materials by Marine Diatoms." 7<sup>th</sup> International Marine Biotechnology Conference (IMBC 2005), Session on Biomineralization, St. Johns, NL, Canada, June 10, 2005.
1. Rorrer, G.L., Chang, C.-H., **Jeffryes, C.**, Liu, S.-H., Qin, T., Jiao, J. "Cellular Biosynthesis of Nanostructured Semiconductor Materials." 229<sup>th</sup> National Meeting of the American Chemical Society (ACS), Division of Industrial & Engineering Chemistry (I&EC), Session on Nanotechnology and the Environment, San Diego CA., March 17, 2005.

### ***Patents and Inventions***

1. Rorrer, G.L., Chang, C.-H., **Jeffryes, C.**, Qin, T., Lee, D.-h., Gale, D. "Method for making metal oxides." Pub. No.: US 2007/0128707 A1.La

### ***Outreach and Service to Traditionally Underrepresented Groups***

4. Mentor, McNair Scholars Program. Mentee: Cleveland Elijah Keal (2019)
3. Collaboration with the Center for the Development of Renewable Energy (Algiers and Ghardaïa, Algeria) to host scientists coming from less-developed nations who wish to study biotechnology and engineering. [www.cder.dz](http://www.cder.dz). Director: Samira Chader.
2. DaVinci Days, Discover OSU! Engineering Pavilion, Nanobiotechnology, Corvallis OR, July 15 – 16, 2006; July 21 – 22, 2007; July 19 – 20, 2008.
1. Mentor, Oregon Academy of Science and Engineering (ASE), summers 2004, 2005, 2006, 2008. Mentored summer science projects for high school students from underrepresented groups.

### ***Awards***

6. Lamar University Merit Award (Highest Award for Assistant e7 (g.)-9 <</Mg. (ps.

### ***Awards***

2. Processes (I.F. 2.05), Editorial Board, 04/2020 – present

xEditorial Board, 04/2020 –

xEditor for Special Issue, “Synthesis of Nanomaterials for Water and Wastewater Treatment Technologies.” Issue in Progress.

1. Molecules (I.F. 3.098) Editor for special issues

xEditor for Special Issue “Biogenic Nanomaterials: Versatility and Applications” 2020, 25(9).

xEditor for Special Issue “New Developments and Emerging Trends in Microwave Technology and Chemical Synthesis.” Issue in Progress.

### **Session and Division Chair at International Conferences**

5. AIChE Annual Meeting, Sustainability and Sustainable Biorefineries, Sustainable Engineering Forum Poster Session Division Chair, Session 513, Nov 10, 2021.

4. AIChE Annual Meeting, Systems and Quantitative Biology: Modeling Biological Processes, Session 612, Nov 13, 2019

3. AIChE Annual Meeting, Advances in Bioprocess Design for Cell Culture and Bioproduct Production, Session 498, Nov 13, 2019

2. AIChE Annual Meeting, Design for a Circular Economy, Session 325, Nov 12, 2019

1. AIChE Annual Meeting, Green Chemistry and Engineering, Session 211, Nov 11, 2019

**Manuscript reviews for** Nature Scientific Reports, Energy and Environmental Science, New Journal of Chemistry, Journal of Materials Chemistry, Algal Research, Biomass and Bioenergy, RCS Advances, Journal of Applied Phycology, Biomaterials, Journal of Advanced Research, Fuel

**NSF Panel Review** Winter 2016, Winter 2017, Winter 2020

University committees: Institutional Research Board (IRB) (2017 – ); Chemical Engineering ABET Committee Chair (2017 – ); Chemical Engineering SACS Undergraduate Committee Chair (2017 – ); Lamar University Underclassmen Retention Committee (2018 – ); Center for Midstream Management and Science (2019 – ); Artificial Intelligence Certificate Program Committee (2019 – ); Faculty search committee for Lamar University Dept. of Biology (Spring 2016)

Faculty adviser: Chi Omega Epsilon (Chemical Engineering Honor Society, 2016 – ), Lamar University Cardinal Wrestling Club (2017 – 2019), Lamar University Mixed Martial Arts Club (2019 – )

### **News Media**

1. Science News Daily: Ancient Diatoms Lead



7. Completed Blackboard certification program in "Online Course Facilitation Using Blackboard" (May 2020)
6. Completed Blackboard certification program in "Online Course Design and Development" (May 2020)
5. ABET Workshop, "Fundamentals of Program Assessment," ABET Headquarters, Baltimore, MD, June 14, 2019.
4. Seminar, "Writing/Designing Winning NSF Proposals," Houston Marriott Medical Center, Houston, TX, Jan 28, 2019.
3. Seminar, "Writing/Designing Winning NSF Proposals," Houston Marriott Medical Center, Houston, TX, Jan 25, 2016.
2. NSF Grants Conference, Nov 2 – 3, 2015 (webcast).
1. SMART faculty enhancement program, Lamar University, 2015 – 2016.

Jan 16, 2022