AMELIA-ELENA ROTARU (Dr. Rer. Nat)

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WORK EXPERIENCE

2015-current: Assistant professor, Group leader
NORDCEE, Department of Biology, University of Southern Denmark, DK

2017 (6 months): Guest assistant professor
Department of Microbiology, University of Massachusetts Amherst, USA

2013-2015: FNU Postdoctoral Fellow
NORDCEE, Department of Biology, University of Southern Denmark, DK

2010-2013: Postdoctoral Researcher
Department of Microbiology, University of Massachusetts Amherst, USA

2009-2010: Postdoctoral Researcher
iNANO and Department of Bioscience Aarhus University, DK

EDUCATION

2009 (9/06): Doctorate, *magna cum laude*, Marine Microbiology
Max Planck Institute for Marine Microbiology, Bremen, DE

2005: MSc, Marine Microbiology
Max Planck Institute for Marine Microbiology, Bremen, DE

2003: MSc, Biochemistry, *discontinued* in favor of the program above for which I was awarded a fellowship
Faculty of Biology, University of Bucharest, Bucharest, RO

2002: BSc, Biochemistry
Faculty of Biology, University of Bucharest, Bucharest, RO

RESEARCH LEADERSHIP

My research group consists of 6 people. Our group has strong ties with Danish (AU, DTU) as well as international research groups (UMass, USC Berkley, UFZ Leipzig, and University of Radboud), but also with industry partners (*e.g.* DTI, Xergi, Landia). Presently, I am principal investigator on two grants funded by national and private agencies and work package leader on a multi-national grant. Our research is at the interface between electrochemistry and applied microbiology. In our group we investigate how to store renewable electricity into valuable chemicals using microorganisms as catalysts. Electric properties of microorganisms are of interest to find solutions to a global fuel and chemical crisis, but also for prevention of costly processes like corrosion of metallic infrastructure. You can find more details about our research and group members at rotarulab.com.

HONEORS, AWARDS and GRANTS

- **Research Prize** Fyens Stiftidsende (2016) – offered to outstanding Fyn-based researchers in natural science and in social science.
- Travel grant SIAM visiting scientist (2016).

- **START-UP grant** (7 mil) known as the **Sapere Aude research leadership grant** from the Danish Research Council (2015-2019), which is equivalent to an ERC start-up grant.
- Novo Nordisk postdoctoral grant (2.5 mil) for independent research (2015-2018);
- Work package leader (2014-2018) on an Innovationfonden grant (20 mil, 2.5 at SDU);
- FNU postdoc grant (2 mil. from 2013-2015)
- Dale T. Mortensen postdoctoral fellowship (2013 - *declined*)
- Teaching award (2006), Marmic, MPI Bremen
- Scholarship MSc (2003-2005), Marmic, Max Planck Society
- Excellence scholarship BSc (1998-1999, 2001-2002)

RESEARCH INTERESTS

Microbe-surface interactions, interspecies interactions, synthetic biology, adaptive evolution, bioelectrochemical technologies, metabolic engineering, (*bio*)prospecting

EXPERTISE

Microbiology, biochemistry and chemical analyses

Aerobic and anaerobic cultivation, co-cultivation, evolution studies in co-cultures, microbial physiology including determination of metabolites (by HPLC, IC, GC and GC-MS), isotope-labeling experiments and determination of labeled metabolites (IRMS), anaerobic enzyme assays, thermodynamics, electron microscopy (TEM, SEM), elemental/metal determination (EDX and soluble metal assays for Pd, Au, Fe), chemical group identification by FTIR, isotopic fractionation by IRMS

Molecular biology and genetics

Omics (transcriptomics, metagenomics), quantitative PCR, fluorescence microscopy (FISH and CARD FISH), NanoSIMS (Nanoscale secondary ion mass spectrometry), gene-deletion mutagenesis, heterologous gene-insertions for metabolic engineering

Electrochemistry

Bioelectrochemical system technologies (microbial fuel cells and microbial electrosynthesis cells/ H-cells), cyclic voltammetry, corrosimetry

PROFESSIONAL SERVICES AND AFFILIATIONS

Guest editor

Frontiers in Microbiology for the focused topic “Wired for life”

Reviewer

Science, mBio, ISME Journal, Applied and Environmental Microbiology, Water Research, Environmental Science and Technology, Biotechnology for Biofuels, Journal of CO_2 utilization, Systematic and Applied Microbiology, Scientific Reports, Energy and Fuels, Frontiers in Microbiology, Industrial Engineering Chemistry Reports

PhD thesis reviewer:

2017 Radboud University (Netherlands)
2017 Danish Technological University (Denmark)
2017 VTT Research Center University of Helsinki (Finland)
2015 University of Queensland (Australia)

Professional memberships:

Danish Microbiological Society, American Society of Microbiology, International Society for Microbial Ecology, International Society for Microbial Electrochemical Technologies, American Association for the Advancement of Science

SUPERVISION AND TEACHING

My **research group** consists of 6 people:

2 Postdocs: Satoshi Kawaichi PhD and Oona Snoeyenbos West PhD
2 PhD students: Yee Mon Oo and Paola Palacios
1 Lab technician: Lasse Ørum Smidt
1 Master Student: Daniel Jensen

Completed (co)- and/or full supervision of:

3 visiting PhD students (J. Zhang and S. Chen at UMASS and B. Hosseinkhani at AU)
2 master student lab rotations (U. Jaekel and P. Gomez at MPI Bremen)
2 Bachelor theses (BSc J. Rønning SDU – top grade; BEng Sid Sod, UMASS)
5 Bachelor research projects (V. Moebus, R. Pors at SDU – top grades; D.C. Flores, M. Murnane & B. Markovaite at UMASS)

Lecturer for the following courses:

BB535 *Biology from molecules to ecosystems* (Autumn 2016 – current, SDU)
BB536 *A sustainable future* (Spring 2016 – current, SDU)
BB515 *Bio-monitoring of pollution in freshwater systems* (2015 SDU)
Biology of the Prokaryotes (2006-2008 MPI Bremen)

PRESENTATIONS

Participated in more than 20 international and national conferences and symposia, with poster and oral presentations. Underneath are highlighted 3 keynotes and 17 invited talks.

Talks

2018 (*scheduled*)

23. Invited conference speaker. ISMET-NA, St. Paul, Minnesota, USA
22. Invited conference speaker. Goldschmidt 2018, Boston, MA, USA
21. Invited speaker. SDU Microbiology Lecture Series, Odense, DK
20. Invited conference speaker. Gordon Research conference: molecular basis of microbial 1C metabolism, Maine, USA

2017

19. Invited conference speaker. Marburg Spotlight on Microbiology, Joint graduate school of the LOWE center for Synthetic Microbiology and the Collaborative Research Center, Marburg, DE
18. Invited conference speaker. Survival Artists Workshop, MPI Marburg, DE
17. Invited speaker. University of California Dana and Dornsife, USA
16. Invited speaker. Stanford University, USA
15. Keynote conference speaker. Redox active minerals meeting, Manchester, UK
14. Invited conference speaker. Geomicrobiology network meeting, Manchester, UK

2016

13. Keynote conference speaker. KNVM meeting, Nijmegen, NL
12. Invited speaker. Radboud University Nijmegen, NL
11. Invited speaker. Helmholtz Center for Environmental Research, Leipzig, DE
10. Invited conference speaker. ASM meeting, Boston, USA
9. Invited conference speaker. JAMS, Sydney, AUT
8. Invited speaker. University of New Castle, UK
7. Invited speaker. University of Oldenburg, DE

2015

6. Keynote conference speaker. Danish Microbiological Society meeting, Copenhagen, DK
5. Conference speaker. 6th BioMicroWorld meeting, Barcelona, Spain
4. Invited speaker. Departmental Lecture Series, Dept. of Biology, SDU Odense, DK

2014

3. Invited speaker. University of Aarhus DK, 28/02/2014

2012

2. Conference speaker. 14th ISME meeting, Copenhagen, DK

2007

1. Conference speaker. VAAM, Osnabruck DE

PUBLICATIONS

26 peer-reviewed papers, of which: 10 as 1st author, 3 as last author and 11 as corresponding author
For details and links see my: google scholar profile.
My *h*-factor is 19 and I've been cited more than 1900 times (in February 2018).

*Star denotes corresponding authorship
§ denotes student/postdoc supervised
# denotes shared first authorship
IF denotes impact factor for 2016

2018

1. Snoeyenbos-West O[§#], Kawaichi S[§#], Palacios PA[§], Yee MO[§], **Rotaru AE*.** Mechanisms of microbial influenced corrosion. (Submitted 2/2018)

2017

Submitted

2. **Rotaru AE***, Calabrese F, Stryhanyuk H, Shrestha PM, Weber HS, Snoeyenbos-West O[§], Hall P, Richnow H, Musat N, Thamdrup B. Syntrophic acetate oxidation facilitated by conductive minerals between microorganisms from coastal sediments. (11/2017) BioRxiv 218343 https://www.biorxiv.org/content/early/2017/11/03/213843 (Submitted to ISI journal 2/2018)
3. Holmes D, Orelana D, Giloteaux L, Wang LY, Shrestha PM, Williams K, Lovley D, **Rotaru AE***. Active subterraneous *Methanosarcina* could aid bioremediation in a uranium-contaminated aquifer. (10/2017) BioRxiv 202242 https://www.biorxiv.org/content/early/2017/10/12/202242 (Submitted to ISI journal 1/2018)

2016

4. **Rotaru A-E*,** Thamdrup B. 2016. A new diet for methane oxidizers. *Science* 351:658 (*IF 37.2*).
5. **Rotaru A-E***, Shrestha PM. 2016. Wired for life (ed.). *Frontiers in microbiology* 7: 662 (*IF 4*).

2015

6. **Rotaru A-E***, Woodard TL, Nevin KP, Lovley DR. 2015. Link between capacity for current production and syntrophic growth in *Geobacter* species. *Frontiers in microbiology* 6. (*IF 4*)
7. Liu F**, Rotaru A-E**, Shrestha PM, Malvankar NS, Nevin KP, Lovley DR. 2015. Magnetite Compensates for the Lack of a Pilin-Associated c-Type Cytochrome in Extracellular Electron Exchange. *Environmental Microbiology* 17. (*IF 6*)

2014

8. Shrestha PM, **Rotaru A-E.** 2014. Plugging in or Going Wireless: Strategies for Interspecies Electron Transfer. *Frontiers in Microbiology* 5:237. (*IF 4*)
9. Shrestha P, Malvankar N, Werner J, Franks A, **Rotaru A-E**, Shrestha M, Liu F, Nevin K, Angenent L, Lovley D. 2014. Correlation between microbial community and granule conductivity in anaerobic bioreactors for brewery wastewater treatment. *Bioresource Technology* 174:306-310. (*IF 6*)
10. **Rotaru A-E*#**, Shrestha PM[#], Liu F, Shrestha M, Shrestha D, Embree M, Zengler K, Wardman C, Nevin KP, Lovley DR. 2014. A new model for electron flow during anaerobic digestion: direct interspecies electron transfer to *Methanosaeta* for the reduction of carbon dioxide to methane. *Energy & Environmental Science* 7:408-415. (*IF 29.5*) ***This paper has been extremely highly cited with more than 50 citations per year. It is a groundbreaking study, which changed our understanding of microbial interspecies interactions in anaerobic digestion.*
11. **Rotaru A-E***, Shrestha PM, Liu F, Markovaite B[§], Chen S[§], Nevin KP, Lovley DR. 2014. Direct interspecies electron transfer between *Geobacter metallireducens* and *Methanosarcina barkeri*. *Applied and Environmental Microbiology* 80:4599-4605. (*IF 3.2*)
12. Feist A, Nagarajan H, **Rotaru A-E**, Tremblay P-L, Zhang T, Nevin K, Lovley D, Zengler K. 2014. Constraint-based modeling of carbon fixation and the energetics of electron transfer in *Geobacter metallireducens*. *PL o S Computational Biology* 10:e1003575. (*IF 4.5*)
13. Chen S[§], **Rotaru A-E***, Shrestha PM, Malvankar NS, Liu F, Fan W, Nevin KP, Lovley DR. 2014. Promoting interspecies electron transfer with biochar. *Scientific Reports* 4:5019. (*IF 4.3*)
14. Chen S[§], **Rotaru A-E***, Liu F, Philips J, Woodard T, Nevin KP, Lovley DR. 2014. Carbon cloth stimulates direct interspecies electron transfer in syntrophic co-cultures. *Bioresource Technology* 173:83-86. (*IF 6*)

2013

15. Shrestha PM, **Rotaru A-E**, Aklujkar M, Liu F, Shrestha M, Summers ZM, Malvankar N, Flores DC[§], Lovley DR. 2013. Syntrophic growth with direct interspecies electron transfer as the primary mechanism for energy exchange. *Environmental microbiology reports* 5:904-910 (*IF 3.4*)
16. Shrestha PM, **Rotaru A-E**, Summers ZM, Shrestha M, Liu F, Lovley D. 2013. Transcriptomic and genetic analysis of direct Interspecies electron transfer. *Applied and environmental microbiology* 79:2397-2404. (*IF 3.2*) ***This paper has been the editorial pick for no.79 of the journal Appl. Environ. Microbiol.*
17. Nagarajan H, Embree M, **Rotaru A-E**, Shrestha PM, Feist AM, Palsson BØ, Lovley DR, Zengler K. 2013. Characterization and modelling of interspecies electron transfer mechanisms and microbial community dynamics of a syntrophic association. *Nature Communications* 4:2809. (*IF 12.1*)

2012

18. **Rotaru A-E***, Shrestha PM, Liu F, Ueki T, Nevin K, Summers ZM, Lovley D. 2012. Interspecies electron transfer via hydrogen and formate rather than direct electrical connections in co-cultures of *Pelobacter carbinolicus* and *Geobacter sulfurreducens*. *Applied and Environmental Microbiology* 78:7645-7651. (*IF 3.2*)
19. **Rotaru A-E**, Schauer R, Probian C, Mussmann M, Harder J. 2012. Visualization of Candidate Division OP3 Cocci in Limonene-Degrading Methanogenic Cultures. *Journal of Microbiology and Biotechnology* 22:457-461. (*IF 1.6*)
20. **Rotaru A-E**, Jiang W, Finster K, Skrydstrup T, Meyer RL. 2012. Non-enzymatic palladium recovery on microbial and synthetic surfaces. *Biotechnology and Bioengineering* 109:1889-1897. (*IF 4.5*) ***This paper has been the editorial pick for no. 109 of Biotech. & Bioeng.*
21. Liu F, **Rotaru A-E**, Shrestha PM, Nevin K, Lovley D. 2012. Promoting direct interspecies electron transfer with activated carbon. *Energy & Environmental Science* 2012:8982-8989. (*IF 29.5*)
22. Hosseinkhani B[§], Søbjerg LS, **Rotaru A-E**, Emtiazi G, Skrydstrup T, Meyer RL. 2012. Microbially supported synthesis of catalytically active bimetallic Pd-Au nanoparticles. *Biotechnology and bioengineering* 109:45-52. (*IF 4.5*)

2011

23. Morita M, Malvankar NS, Franks AE, Summers ZM, Giloteaux L, **Rotaru A-E**, Rotaru C, Lovley DR. 2011. Potential for direct interspecies electron transfer in methanogenic wastewater digester aggregates. *mBio* 2:e00159-00111. (*IF 7*)
24. Lovley D, Ueki T, Zhang T, Malvankar N, Shrestha P, Flanagan K, Aklujkar M, Butler J, Giloteaux L, **Rotaru A-E** et al 2011. Geobacter: the microbe electric's physiology, ecology, and practical applications. *Advances in microbial physiology* 59:1-100. (*IF 3.4*)

2010

25. **Rotaru A-E**, Probian C, Wilkes H, Harder J. 2010. Highly enriched Betaproteobacteria growing anaerobically with p-xylene and nitrate. *FEMS microbiology ecology* 71:460-468. (*IF 3.7*)
26. Bunge M, Søbjerg LS, **Rotaru A-E**, Gauthier D, Lindhardt AT, Hause G, Finster K, Kingshott P, Skrydstrup T, Meyer RL. 2010. Formation of palladium (0) nanoparticles at microbial surfaces. *Biotechnology and bioengineering* 107:206-215. (*IF 4.5*) ***This paper has been the editorial pick of no. 107 of Biotech. and Bioeng.*