

**AMELIA-ELENA ROTARU (Dr. Rer. Nat)**

**arotaru@biology.sdu.dk**  
**[www.rotarulab.com](http://www.rotarulab.com)**



## **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](http://rotarulab.com).

## **HONORS, AWARDS and GRANTS**

**[Total funded research as PI in € = 1,958,088]**

**2016: Research Prize Fyens Stiftidsende (25,000 DKK or 3358 €)**

*Offered to outstanding Fyn-based researchers in natural science and in social science*

**2016: Travel grant (600€)**

*SIAM visiting scientist*

**2015-10/2019:PI, START-UP grant (7 mil. DKK or 940,310€)**

*Sapere Aude research leadership grant from the Danish Research Council, equivalent to an ERC start-up grant, DK*

**2015-10/2018: PI, Novo Nordisk postdoctoral grant (2.5 mil or 335,825€)**

*Awarded to 2/70 researchers to carry research in biotechnology-based synthesis and production, DK*

**2014-2019: WP-leader, Innovationfonden grant (20 mil. DKK or 2,686,543€ of which only 413,333€ at SDU)**

*Collaborative grant between Aarhus University, University of Southern Denmark, University of Queensland, University of Southern California Dornsife, and Stanford University*

**2013-2015: PI, FNU postdoc grant (2 mil. DKK or 268,620€)**

*Awarded by the Danish Research Council for Natural Science Research, DK*

**2013 (*declined*) Dale T. Mortensen postdoctoral fellowship (2,4 mil DKK or 322,392€)**

*Awarded by the Aarhus Institute for Advanced Studies, DK*

**2006: Teaching award**

*Awarded by Marmic Master Class of 2009, MPI Bremen, DE*

**2003-2005: MSc Scholarship (13,500€)**

*Awarded by the Max Planck Society via the International Max Planck Research School for Marine Microbiology, DE*

**1998: Excellence scholarship**

*Awarded for achieving the 3<sup>rd</sup> best score of 1000 applicants at the admission exam for the undergraduate education in Biochemistry, University of Bucharest, RO*

**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, corrosionmetry

**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<sub>2</sub> 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**

24. Invited conference speaker. ISMET-NA, St. Paul, Minnesota, USA (*scheduled*)
23. Invited conference speaker. Gordon conference: molecular basis of microbial C1 metabolism, Maine, USA (*scheduled*)
22. Invited speaker. SDU Microbiology Lecture Series, Odense, DK
21. Invited speaker at DTU Center for Biosustainability, Lyngby, DK
20. Invited speaker and workshop-teacher, University of Wageningen, NL

**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. 6<sup>th</sup> 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. 14<sup>th</sup> ISME meeting, Copenhagen, DK

#### 2007

1. Conference speaker. VAAM, Osnabruck DE

### PUBLICATIONS

For the past 8 years I published 25 papers, which accrued more than 2200 citations, and an h-index of 19, according to Google Scholar (6/2018). Additionally, I have 3 papers ready for submission or in the submission process, and more than 6 papers in preparation (not mentioned in this CV).

For details and links see my: [google scholar profile](#).

### Journal statistics

# of papers	Journal	IF (2016)
1	Science	37.2
2	Energy and Environmental Science	29.5
1	Nature Communications	12.1
2	mBio	6.9
1	Advances in Microbial Physiology	5.8
2	Bioresource Technology	5.6
1	Environmental Microbiology	5.3
3	Biotechnology and Bioengineering	4.5
1	P L o S Computational Biology	4.5
1	Scientific Reports	4.2
3	Frontiers in Microbiology	4.0
1	FEMS Microbiology Ecology	3.9
3	Applied and Environmental Microbiology	3.8
1	Microbial Ecology	3.6
1	Environmental Microbiology Reports	3.4
1	Journal of Biotechnology and Microbiology	1.8
5	Ready for submission/Submitted	NN
6	In Prep	NN

\*Star denotes corresponding authorship

<sup>§</sup> denotes student/postdoc supervised

<sup>#</sup> denotes shared first authorship

IF denotes impact factor for 2016

OA denotes open access

#### 2017/2018

1. Holmes DE<sup>#</sup>, Shrestha PM<sup>#</sup>, Rotaru AE<sup>#</sup>, Ueki T, Lovley DR. Transcriptomic analysis of direct interspecies electron transfer in *Methanosarcina barkeri*. (to be submitted)

2. **Rotaru AE\***, Loescher C, Posth N, Miracle M, Vincente E, Cox R, Thomson J, Poulson S, Thamdrup B. Interspecies interactions mediated by minerals in sediments of Lake La Cruz (to be submitted)
  3. Ueki T<sup>#</sup>, Nevin K<sup>#</sup>, **Rotaru AE**, Wang LY, Ward JE, Woodard TL, Lovley DR. *Geobacter* strains expressing poorly conductive pili reveal constraints on direct interspecies electron transfer mechanisms. Submitted to *mBio*.
  4. **Rotaru AE\***, Calabrese F, Stryhanyuk H, Shrestha PM, Weber HS, Snoeyenbos-West O<sup>s</sup>, Hall P, Richnow H, Musat N, Thamdrup B. 2018. Conductive particles mediate syntrophic acetate oxidation between *Geobacter* and *Methanosarcina* from coastal sediments. *mBio* 9 (3): e00226-18 (OA)
  5. Holmes D, Orelana D, Giloteaux L, Wang LY, Shrestha PM, Williams K, Lovley D, **Rotaru AE\***. 2018. Potential for *Methanosarcina* to contribute to uranium reduction during acetate-promoted groundwater bioremediation. *Microbial Ecology* pp. 1-8 (OA)
- 2016**
6. **Rotaru A-E\***, Thamdrup B. 2016. A new diet for methane oxidizers. *Science* 351:658 (IF 37.2).
  7. **Rotaru A-E\***, Shrestha PM. 2016. Wired for life (ed.). *Frontiers in microbiology* 7: 662 (IF 4).
- 2015**
8. **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)
  9. 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**
10. Shrestha PM, **Rotaru A-E**. 2014. Plugging in or Going Wireless: Strategies for Interspecies Electron Transfer. *Frontiers in Microbiology* 5:237. (IF 4)
  11. 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)
  12. **Rotaru A-E\***<sup>#</sup>, Shrestha PM<sup>#</sup>, 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.**
  13. **Rotaru A-E\***, Shrestha PM, Liu F, Markovaita B<sup>s</sup>, Chen S<sup>s</sup>, 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)
  14. 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*. *PLoS Computational Biology* 10:e1003575. (IF 4.5)
  15. Chen S<sup>s</sup>, **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)
  16. Chen S<sup>s</sup>, **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**
17. Shrestha PM, **Rotaru A-E**, Akujkar M, Liu F, Shrestha M, Summers ZM, Malvankar N, Flores DC<sup>s</sup>, 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)
  18. 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.**
  19. Nagarajan H, Embree M, **Rotaru A-E**, Shrestha PM, Feist AM, Palsen 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**
20. **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)
  21. **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)
22. 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.**
  23. 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)
  24. Hosseinkhani B<sup>§</sup>, Søjberg 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**
25. 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)
  26. 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**
27. 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)
  28. Bunge M, Søjberg 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.**