CV

Dr. Anja Spang, Senior Scientist
Birth: 22.11.1983
Address: Royal Netherlands Institute for Sea Research, Lansdiep 4 1797SZ 't Horntje, Texel, The Netherlands
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SUMMARY OF RESEARCH

I have a key interest in the evolution of phylogenetic and metabolic diversity of life and the role symbiosis has played in the major evolutionary transitions. Supported by a doc-fForte fellowship by the Austrian Academy of Sciences to fund my PhD thesis, I had early on the chance to contribute insights to the evolution of archaea. For my PhD thesis, I received an Award of Excellence 2013 from the Austrian Minister of Science and Research.

After my PhD in 2013, I was awarded an Intra-European Marie Curie Fellowship to join the research group of Dr. Thijs Ettema in Uppsala, Sweden, where I contributed major new insights into the role of Archaea in the evolution of eukaryotes. During this time, I developed essential methodological skills and gained experience in management, teaching and supervision. Together, this has allowed me to lead independent research resulting in the publication of articles in recognized journals (e.g. in *Nature*, *Science*) and to present my work at various conferences as invited speaker (e.g. *Gordon, SMBE, ASM, ISME)*.

In September 2017, I have relocated to the Royal Netherlands Institute for Sea Research (NIOZ), to establish my independent line of research as tenure track scientist. My work has been supported by a NWO Women In Science Excel (WISE) tenure track award from the Netherlands Organization for Scientific Research and a VR-starting grant from the Swedish Research council. In 2020, I received an ERC starting grant (ASymbEL), a UU-NIOZ fellowship to fund a post-doctoral researcher for three years, a Model Systems Award from the Gordon and Betty Moore Foundation (Main-PI in consortium of 5 PIs), as well as two eukaryogenesis awards from the Gordon and Betty Moore Foundation and Simmons Foundation, respectively (as CO-PI in two different consortia). I have received tenure in 2021 and am now employed as Research Leader at NIOZ and Special Chair Professor at the University of Amsterdam (from 12/2022). A major focus of my work is to improve our knowledge on the deep roots of microbial life on Earth, the origin and diversification of eukaryotes and the role of recently discovered archaeal symbionts in the evolution, ecology and diversification of their hosts and ecosystem functioning.

DEGREES & SCIENTIFIC CAREER

1/2009-5/2013 **PhD** (Disputation date: 14.05.2013)
Department of Genetics in Ecology at the University of Vienna (Austria)
Title: Genome Analyses and Comparative Genomics of Thaumarchaeota
- supervisors: Dr. Christa Schleper (main) & Dr. Michael Wagner (co)
- opponents: Dr. Eugene Koonin, Dr. Martin Embley, Dr. Matthias Horn

2007-12/2008 **Master of science** (Microbiology) (MSc),
Bergen University (Norway)
Title: Enrichment of microorganisms from an icelandic hot spring and study of associated viruses using microscopy and shot-gun sequencing (A-level graduation)

2004-2006 **Bachelor in biology**, Department of Biology at Bergen University (Norway)
Main subjects: microbiology, evolutionary biology, genetics

9/2007-11/2008 ERASMUS Student exchange, Department of Genetics in Ecology at the University of Vienna (Austria)

11/2007-1/2008 Two-month research-internship, Division of Microbial Ecology at the University of Vienna (Austria)
Title: „Insertion elements and the mosaic-like genome of Amoebophilus asiaticus", supervisor: Dr. Matthias Horn

ACADEMIC POSITIONS

from 11/2022 Research Leader
MMB, Royal Netherlands Institute for Sea Research, Texel (Netherlands)

from 12/2022 Special Chair Professor
University of Amsterdam (Netherlands)

1/2021-10/2022 Senior Scientist (100% appointment)
MMB, Royal Netherlands Institute for Sea Research, Texel (Netherlands)

3/2021-12/2021 Senior Scientist (80% appointment)
MMB, Royal Netherlands Institute for Sea Research, Texel (Netherlands)

9/2017-2/2021 Tenure Track Scientist (80% appointment)
MMB, Royal Netherlands Institute for Sea Research, Texel (Netherlands)

9/2017-12/2021 Researcher (20% appointment)
Department of Cell- and Molecular Biology at Uppsala University (Sweden)

5/2013-9/2017 Postdoctoral researcher
Department of Cell- and Molecular Biology at Uppsala University (Sweden)

SCIENTIFIC SERVICES and other ACADEMIC ACTIVITIES

2022 Editor for Special Edition on Eukaryogenesis, Scientific Reports
2021 Editor for Environmental Microbiology
since 2013: Referee for the ISME journal, Frontiers in Microbiology, PlosONE, Nature, Nature Microbiology, Nature Ecology and Evolution, Nature Communications, Nature Commincations Biology, Science, Environmental Microbiology and Environmental Microbiology Reports, mSystems of the American Society for Microbiology) and grant applications (ERC starting and consolidator grants, DFG grant, Leverhulme Trust, Zukunftskolleg)
March, 2020 PhD evaluation committee of Jacob Brand, Aalborg University, Denmark (supervisor: Prof. Mads Albertsen)
since 2020 External expert of PhD committee of Garance Sarton-Lohéac, Lausanne University, Switzerland (supervisor: Prof. Philipp Engel)
2020 Member of master thesis evaluation committee of Ross Daniel Scambler, Bristol University, UK (supervisor: Prof. Tom Williams)

ACADEMIC TEACHING

2022 Guest Lecture about Archaea in Microbial Ecology Course (Msc-level) at IBED at Amsterdam University
2021 Guest speaker in MSc course "Current trends in ecology and evolution"
2021 Interview with students in Microbial Ecology Course (Msc-level) at IBED at Amsterdam University
2020 Guest Lecture about Archaea in Microbial Ecology Course (Msc-level) at IBED at Amsterdam University
since 2019 Yearly Lecturer in the Marine Sciences Course (Bachelor-level) at Utrecht University
since 2019 Yearly to bi-yearly lecturer in a Bioinformatics Course for PhD students and post-docs at NIOZ
2016 & 2017 Lecturer in the student course “Functional genomics”, of Cell and Molecular Biology, at Uppsala University (Sweden)
2011 & 2012 Tutor in the student course “Methods of Genetics in Ecology”, at the Department of Genetics in Ecology, at the University of Vienna (Austria)
2009-2011 Supervision of two Master students at the Department of Genetics in Ecology, at the University of Vienna (Austria)

OUTREACH ACTIVITIES

since 2017 Dissemination of research in news articles for the public and via social media, e.g. twitter
2021 Advise and provision of material for article on Archaea by Morgan Hoftijzer at Naturalis: https://natuurwijzer.naturalis.nl/leerobjecten/het-mysterieuze-leven-van-archaea
since 2020 Participation as editor and author in an initiative led by Ken Timmis to establish “a child-centric microbiology education framework” as well as an collection of articles with “burning questions”

FUNDING

2021-2025 **UU-NIOZ grant** (349.970 Euro)
2021-2026 **ERC starting grant ASymbEL** (1.869.946 Euro)
2020-2022 **Symbiosis Model System Award**, Gordon and Betty Moore Foundation (as main PI, consortium of 5 PIs) (total 299.981 USD)
2020-2023 **Gordon and Betty Moore Foundation Grant** on Eukaryogenesis (as Co-PI, consortium of 5 PIs) (total 500.000 USD, subgrant to me 150.553 USD)
2020-2023 **Simmons Foundation Grant** on Eukaryogenesis (as Co-PI, consortium of 5 PIs) (total 1.500.000 USD, sub-grant to me 319.283 USD)
2017-2022 **NWO Women In Science Excel (WISE) tenure track award** from the Netherlands Organisation for Scientific Research
2017-2021 **VR starting grant** from the Swedish Research council
2014-2016 **Marie-Curie Intra-European Fellowship** by the European Commission
2010-2012 **DOC-fFORTE PhD fellowship** from the Austrian Academy of Sciences

SUPERVISION

since 2018 Dr. Carlos Santana Molina, 3y post-doc since 10/2021
Dr. Oleksandr Maistrenko, 3.5y post-doc since 07/2021

Dr. Florian Meyer, 2y post-doc, since 2020 (first year in Regensburg, now at NIOZ)
Dr. Joshua Hamm, 3y post-doc since 9/2020
Dr. Nina Dombrowski, 3+4y post-doc since 8/2018
Dr. Jun-Hoe Lee, 2y post-doc, 2017-2019
Wen-Cong Huang, 4y PhD student since 08/2021
Tara Mahendrarajah, 4y PhD student since 2/2019
Gerben de Zwaan, Master student, 10/2020-04/2021 (shared student with Dr. Laura Villanueva)
Josje Romeijn, Master student, 12/2021-07/2022
Kim van Maldegem, Master student, 11/2020-05/2021
Scott Maxson, 50% technical assistant since 02/2021

2014-2017 Supervision of one and daily supervision of another Master student as well as co-supervision of two PhD students at Department of Cell and Molecular Biology, at Uppsala University (Sweden)

2009-2011 Co-supervision of two Master students at the Department of Genetics in Ecology, at the University of Vienna (Austria)

PRIZES and AWARDS

2016 **1.st Prize** for best presentation at the Scientific Highlight Contest organized by SciLifeLab, which nominated the top ten SciLifeLab research papers of 2015.

2013 **Award of Excellence 2013** for my PhD thesis from the Austrian Minister of Science and Research

2009 **Poster Award** at the Archaea Gordon Research Conference (Waterville Valley, USA)

ESTABLISHED NATIONAL AND INTERNATIONAL COLLABORATIONS

NATIONAL
- Pierre, Offre; Laura Villanueva, Julia Engelmann, Henk Bolhuis, NIOZ, Netherlands
- Thijs Ettema, University of Wageningen, Netherlands
- Berend Snel, Utrecht University, Netherlands
- Astrid Groot, University of Amsterdam, Netherlands

INTERNATIONAL
- Tom A. Williams, Bristol University, UK
- Gergely Szöllősi, Eötvös University, Hungary
- Chris Rinke and Phil Hugenholtz, University of Queensland, Australia
- Harald Huber and Dina Grohmann, University of Regensburg, Germany
- Buzz Baum, University of Cambridge, UK
- Ricardo Cavicchioli, University of Sydney, Australia
- Alexander Bisson, Brandeis University, USA

PUBLICATIONS:

Peer-reviewed publications

Spang, A., Mahendrarajah, T.A., Offre, P., Stairs, C.W. (2022) Evolving perspective on the origin and diversification of cellular life and the virosphere. *Genome Biol Evol.* 2022 Feb 26:evac034.

Krause, S., Gfrerer, S., Reuse, C., Dombrowski, N., Villanueva, L., Bunk, B., Spröer, C., Neu, T.R., Kuhlicke, U., Schmidt-Hohagen, K., Hiller, K., Rachel, R., **Spang, A**., Gescher, J. (2022) The importance of biofilm formation for cultivation of a Micrarchaeon and its interactions with its Thermoplasmatales host. *Nat Commun*. 2022 Apr 1;13(1):1735.

Moody, E., *Mahendrarajah, T.*, *Dombrowski, N*., Clark, J.W., Petitjean, C., Offre, P., Szollosi, G.J., **Spang, A**., Williams, T.A. (2022) An estimate of the deepest branches of the tree of life from ancient vertically evolving genes. *Elife.* Feb 22;11:e66695.

Coleman, G.A., Davín, A., *Mahendrarajah, T*., Szánthó, L.L., **Spang, A**., Hugenholtz, A., Szöllősi, G.J., Williams, T.A. (2021) A rooted phylogeny resolves early bacterial evolution. Science, 372 (6542)

Reysenbach, A.L., St John, E., Meneghin, J., Flores, G.E., Podar, M., *Dombrowski, N.*, **Spang, A.**, L'Haridon, S, Humphris, S.E., de Ronde, C.E.J., Caratori, Tontini, F., Tivey, M., Stucker, V.K., Stewart, L.C., Diehl, A., Bach, W. (2020) Complex subsurface hydrothermal fluid mixing at a submarine arc volcano supports distinct and highly diverse microbial communities. Proc Natl Acad Sci U S A. 4:202019021.

Martijn, J., Schön, M.E., Lind, A.E., Vosseberg, J., Williams, T.A., **Spang, A**., Ettema, T.J.G. (2020) Hikarchaeia demonstrate an intermediate stage in the methanogen-to-halophile transition. Nat. Commun.;11(1):5490.

Dombrowski, N., Williams, T.A., Sun, J. Woodcroft, B. J., Lee, JH., Minh, B.Q., Rinke, C., & **Spang, A*.** (2020) Undinarchaeota illuminate DPANN phylogeny and the impact of gene transfer on archaeal evolution. *Nat Commun*. 2020;11(1):3939.

Stairs, C.W., Dharamshi, J.E., Tamarit, D., Eme, L., Jørgensen, S.L., **Spang, A.,** & Ettema T. (2020). Chlamydial contribution to anaerobic metabolism during eukaryotic evolution. *Science Advances* 6 (35),2020 Aug 26;6(35).

Murray, A. E., Freudenstein, J., Gribaldo, S., Hatzenpichler, R., Hugenholtz, P., Kämpfer, P., Konstantinidis, K. T., Lane, C. E., Papke, R. T., Parks, D. H., Rossello-Mora, R., Stott, M. B., Sutcliffe, I. C., Thrash, J. C., Venter, S. N., Whitman, W. B., Acinas, S. G., Amann, R. I., Anantharaman, K., Armengaud, J., Baker, B.J., Barco, R.A., Bode, H.B., Boyd, E.S., Brady, C.L., Carini, P., Chain, P.S.G., Colman, D.R., DeAngelis, K.M., de Los Rios, M.A., Estrada-de Los Santos, P., Dunlap, C.A., Eisen, J.A., Emerson, D., Ettema, T.J.G., Eveillard, D., Girguis, P.R., Hentschel, U., Hollibaugh, J.T., Hug, L.A., Inskeep, W.P., Ivanova, E.P., Klenk, H.P., Li, W.J., Lloyd, K.G., Löffler, F.E., Makhalanyane, T.P., Moser, D.P., Nunoura, T., Palmer, M., Parro, V., Pedrós-Alió, C., Probst, A.J., Smits, T.H.M., Steen, A.D., Steenkamp, E.T., **Spang, A.**, Stewart, F.J., Tiedje, J.M., Vandamme, P., Wagner, M., Wang, F.P., **Hedlund, B.P., Reysenbach, A. L.** (2020). Roadmap for naming uncultivated Archaea and Bacteria. *Nature microbiology,* 5(8), 987–994.

Dharamshi, J. E., Tamarit, D., Eme, L., Stairs, C. W., Martijn, J., Homa, F., Jørgensen, S. L., **Spang, A.**, & Ettema, T. (2020). Marine Sediments Illuminate Chlamydiae Diversity and Evolution. *Current biology*: CB, 30(6), 1032–1048.e7.

Camprubí, E., De Leeuw, J.W., House, C.H., Raulin, F., Russell, M.J., **Spang, A.,** Tirumalai M.R., & Westall, F. (2019) The emergence of life. *Space Science Reviews 215 (8), 56*

Schwank, K., Bornemann, T.L.V., Dombrowski, N., **Spang, A.**, Banfield, J.F. and Probst, A.J. (2019) An archaeal symbiont-host association from the deep terrestrial subsurface. *ISME J. 13(8):2135-2139.*

Seitz, K.W., Dombrowski, N., Eme, L., **Spang, A.**, Lombard, J., Sieber, J.R., Teske, A.P. and Ettema, T.J.G. and Baker BJ. (2019) Asgard archaea capable of anaerobic hydrocarbon cycling. *Nat Commun;10(1):1822.*

Spang, A., Stairs, C., Dombrowski, N., Eme, L., Lombard, J., Cáceres, E.F., Greening, C., Baker, B.J. and Ettema, T.J.G. (2019) Proposal of the reverse flow model for the origin of the eukaryotic cell based on comparative analysis of Asgard archaeal metabolism. *Nat. Microbiolog. 4(7):1138-1148.*

Bäckström, D., Yutin, N., Jørgensen, S.L., Dharamshi, J., Homa, F., Zaremba-Niedwiedzka, K., **Spang, A.**, Wolf, Y.I., Koonin, E.V. and Ettema, T.J.G. (2019) Virus Genomes from Deep Sea Sediments Expand the Ocean Megavirome and Support Independent Origins of Viral Gigantism. *MBio*. 5;10(2).

Dombrowski, N., Lee, J.H., Williams, T.A., Offre, P. and **Spang, A. (**2019) Genomic diversity, lifestyles and evolutionary origins of DPANN archaea. *FEMS Microbiol Letters Vol 366: 2, 1.*

Spang, A. and Offre, P. (2019) Towards a systematic understanding of differences between archaeal and bacterial diversity. *Environ Microbiol Rep. 11(1):9-12*.

Kellner, S., **Spang, A**., Offre, P., Szöllősi, G.J., Petitjean, C. and Williams, T.A. (2018). Genome size evolution in the Archaea. *Emerging Topics in Life Sciences 2 (4), 595-605.*

Lind, A.E., Lewis, W.H., **Spang, A**., Guy, L., Embley, T.M. and Ettema, T.J.G. (2018) Genomes of two archaeal endosymbionts show convergent adaptations to an intracellular lifestyle. *ISME Jl 12 (11), 2655 -2667.*

Narrowe, A.#, **Spang, A**.#., Stairs, C.V., Caceres, E.F., Baker, B.J., Miller, C.S., Ettema, T.J.G. (2018) Complex evolutionary history of translation Elongation Factor 2 and diphthamide biosynthesis in Archaea and parabasalids. *Genome biology and evolution 10 (9), 2380-2393*.

Raina, J.B., Eme, L., Pollock, F.J., **Spang, A**., Archibald, J.M. and Williams, T.A. (2018) Symbiosis in the microbial world: from ecology to genome evolution. *Biol Open 7(2).*

Spang, A.#, Eme, L.#, Saw, J.H., Caceres, E.F., Zaremba-Niedzwiedzka, K., Lombard, J., Guy, L. and Ettema, T.J.G. (2018) Asgard archaea are the closest prokaryotic relatives of eukaryotes. *PloS Genetic: 14(3)*

Eme, L., **Spang, A**., Lombard, J., Stairs, C.W. and Ettema T.J.G. (2017) Archaea and the origin of eukaryotes. *Nature Reviews Microbiology 15 (12), 711.*

Spang, A. and Ettema, T.J.G. (2017) Archaeal evolution: The methanogenic roots of Archaea. News and Views Article, *Nature microbiology* 2 (8), 17109.

Spang, A., Caceres, E.F. and Ettema, T. (2017) Genomic exploration of the diversity, ecology, and evolution of the archaeal domain of life. *Science 357 (6351).*

Williams, T.A., Szöllősi, G.J.#, **Spang,A.#**, Foster, P., Heaps, S.E., Boussau, B., Ettema, T.J. and Embley, T.M., Integrative modelling of gene and genome evolution roots the archaeal tree of life. *PNAS, 114(23).*

Zaremba-Niedzwiedzka#, K., Caceres#, E.F., Saw#, J.H., Bäckström, D., Juzokaite, L., Vancaester, E., Seitz, K.W., Anantharaman, K., Starnawski, P., Kjeldsen, K.U., Stott, M.B., Nunoura, T., Banfield, J.F., Schramm, A., Baker, B.J., **Spang, A**., and Ettema, T.J. (2017). ASGARD archaea illuminate the origin of eukaryotic cellular complexity. *Nature 541, 353–358.*

Spang, A. and Ettema, T. (2016) Microbial Diversity: The Tree of Life comes of age. *News and Views Article, Nature Microbiology;* 1:16056.

Klinger, C.M.**#**, **Spang, A.#**, Dacks, J.B. and Ettema, T.J. (2016). Tracing the Archaeal Origins of Eukaryotic Membrane-Trafficking System Building Blocks. *Mol. Biol. Evol. 33(6):1528-41.*

Saw, J.H., **Spang, A**., Zaremba-Niedzwiedzka, K., Juzokaite, L., Dodsworth, J.A., Murugapiran, S.K., Colman, D.R., Takacs-Vesbach, C., Hedlund, B.P., Guy, L. and Ettema, T.J. (2015). Exploring microbial dark matter to resolve the deep archaeal ancestry of eukaryotes. *Philosophical Transactions of the Royal Society B Biological Sciences; 370(1678)*

Spang, A.#, Saw, J.H.#, Jørgensen, S.L.#, Zaremba-Niedzwiedzka, K.#, Martijn, J., Lind, A.E., van Eijk, R., Schleper, C., Guy, L. and Ettema, T.J. (2015). Complex archaea that bridge the gap between prokaryotes and eukaryotes. *Nature; 521(7551):173-9.*

Offre, P., Kerou, M., **Spang, A.** and Schleper, C. (2014). Variability of the transporter complement in ammonia-oxidizing archaea. *Trends in microbiology; 22(12):665-75.*

Guy, L., **Spang, A**., Saw, J. H., and Ettema, T.J. (2014) Geoarchaeon NAG1' is a deeply-rooting lineage of the archaeal order Thermoproteales rather than a new phylum. *ISME; 8(7):1353-7.*

Spang, A., Martijn, J., Lind, A.E., Saw, J.H., Guy, L., and Ettema, T.J. (2013) Close encounters of the Third Domain: the emerging genomic view of archaeal diversity and evolution. *Archaea; 202358* (Special Carl Woese memorial issue)

Offre, P., **Spang, A**. and Schleper, C. (2013) Archaea in biogeochemical cycles. *Annual Rev. in Microbiol.; 67:437-57.*

Eme, L., Reigstad, L.J., **Spang, A**., Lanzén, A., Weinmaier, T., Rattei, T., Schleper, C., and Brochier-Armanet, C. (2013). Metagenomics of Kamchatkan hot spring filaments reveal two new major (hyper)thermophilic lineages related to Thaumarchaeota. *Research in Microbiology; 164(5):425-38.*

Poulsen, M., Schwab, C., Borg Jensen, B., Engberg, R.M., **Spang, A**., Canibe, N., Højberg, O., Milinovich, G., Fragner, L., Schleper, C., Weckwerth, W., Lund, P., Schramm, A. and Urich, T. (2013). Methylotrophic methanogenic *Thermoplasmata* implicated in reduced methane emissions from bovine rumen. *Nature Communications; 4, 1428.*

Spang, A.#, Poehlein, A.#, Offre, P., Zumbrägel, S., Haider, S., Rychlik, N., Nowka, B., Schmeisser, C., Lebedeva, E.V., Rattei, T., et al. (2012). The genome of the ammonia-oxidizing *Candidatus* Nitrososphaera gargensis: insights into metabolic versatility and environmental adaptations. *Env. Microbiol.; 18, 331–340.*

Bartossek, R., **Spang, A**., Weidler, G., Lanzen, A., and Schleper, C. (2012). Metagenomic analysis of ammonia-oxidizing archaea affiliated with the soil group. *Frontiers in Microbiology; 3, 208.*

Svenning, M.M., Hestnes, A.G., Wartiainen, I., Stein, L.Y., Klotz, M.G., Kalyuzhnaya, M.G., **Spang, A**., Bringel, F., Vuilleumier, S., Lajus, A., et al. (2011). Genome sequence of the Arctic methanotroph *Methylobacter tundripaludum* SV96. *Journal of Bacteriology; 193, 6418–6419.*

Schmitz-Esser, S., Penz, T., **Spang, A**., and Horn, M. (2011). A bacterial genome in transition--an exceptional enrichment of IS elements but lack of evidence for recent transposition in the symbiont *Amoebophilus asiaticus*. *BMC Evolutionary Biology; 11, 270.*

Krupovic, M., **Spang, A**., Gribaldo, S., Forterre, P., and Schleper, C. (2011). A thaumarchaeal provirus testifies for an ancient association of tailed viruses with archaea. *Biochemical Society Transactions; 39, 82–88*.

Tourna, M., Stieglmeier, M., **Spang, A**., Könneke, M., Schintlmeister, A., Urich, T., Engel, M., Schloter, M., Wagner, M., Richter, A., et al. (2011). *Nitrososphaera viennensis*, an ammonia oxidizing archaeon from soil. *PNAS; 108, 8420–8425*.

Spang, A.#, Hatzenpichler, R.#, Brochier-Armanet, C., Rattei, T., Tischler, P., Spieck, E., Streit, W., Stahl, D.A., Wagner, M., and Schleper, C. (2010). Distinct gene set in two different lineages of ammonia-oxidizing archaea supports the phylum Thaumarchaeota. *Trends in Microbiol.;* 18, 331–340

Book chapters

Dombrowski, N., Mahendrarajah, T., Gross, S.T., Eme, L., and **Spang, A.** Archaea. Book chapter in the Practical Handbook of Microbiology, 4th Edition.

Blohs, M., Moissl-Eichinger, C., Mahnert, A., **Spang, A.**, *Dombrowski, N*., Krupovic, M., Klingl, A., (2020) Archaea–An Introduction. Book chapter in Encyclopedia of Microbiology, 4th Edition.

Highlights

Albers, S., Ashmore, J., Pollard, T., Spang, A., Zhou, J. (2022). Origin of eukaryotes: What can be learned from the first successfully isolated Asgard archaeon. Faculty Opinions Ltd. 2022

RECENT invited seminars and presentations at conferences:

Anja Spang. Marine Microbes: A Window into Deep Evolutionary Transitions. Frontiers Symposium of the Max Planck Society. Berlin, Germany, 2022. ***Invited Presentation.***

Anja Spang. Marine Microbes: A Window into Deep Evolutionary Transitions. GRC marine microbes, 2022, Les Diabeles, Switzerland. ***Invited Presentation.***

2020/ 2021: I was invited to various conferences (incl. Gordon, SMBE), however, all of them were cancelled due to the corona pandemic. However, I have given various virtual presentations, including invited talks at an Evolution conference, an Archaea meeting, a virtual Metagenomics lecture series, and a WISE seminar. Furthermore, I have given talks at Department seminars, including in Amsterdam, at Illinois, (US), EMBL in Heidelberg (Germany) and MPI in Tügingen (Germany)

Anja Spang. Archaea - how a forgotten domain iIlluminates the dark ages in life`s evolution. Alfried Krupp Science College, Greifswald, Germany (2019). ***Invited Presentation***

Anja Spang. How environmental genomics has changed our perception of archaeal diversity and the evolution of life! Ecological and Evolutionary Genomics Gordon Research Conference, Manchester, NH United (2019). ***Invited Presentation***

Anja Spang. The unexplored world of potential archaeal symbionts. Animal-Microbe Symbioses Gordon Research Conference, West Dover VT United States (2019). ***Invited Presentation***

Anja Spang. Archaea - how a forgotten domain illuminates the dark ages in life`s evolution. Archaea Centre, Regensburg, Germany (2019). ***Invited Presentation***

Anja Spang. Archaea - their expanding diversity and role in key evolutionary events. Lausanne Genomics Days, Lausanne, Switzerland (2019). ***Invited Presentation***

Anja Spang. Symbiosis and the origin of eukaryotes: New insights from the metabolism of Asgard archaea (2018). Science Days at NIOZ, T`Horntje, Netherlands. ***Invited Presentation***

Anja Spang. The evolution of Archaea and their role in the history of life on Earth! (2018). Symposium on frontiers in Microbiology, Max Planck Institute for Terrestrial Microbiology Marburg, Germany. ***Invited Presentation***

Anja Spang. A short history of the archaea, their role in eukaryogenesis and in the evolution of life on Earth. (2018) Fall Meeting of the KNVM, General & Molecular Microbiology, Delft, Netherlands. ***Invited Presentation***

Anja Spang. The evolutionary history of Archaea: an ongoing debate (2018). EMBO workshop on Molecular biology of archaea: From mechanisms to ecology, Vienna, Austria. ***Invited Presentation***

Anja Spang. A short history of the archaea and their role in the evolution of life on Earth (2018). ISME, Leipzig, Germany ***Invited Presentation***

Anja Spang. A short history of the archaea and their role in the evolution of life on Earth. ASM, Brisbane Australia (2018). ***Invited Key Note Presentation***

Anja Spang. A short history of the archaea and their role in the evolution of life on Earth. ASM, Brisbane Australia (2018). ***Invited Presentation***

Anja Spang. Symbiosis and the origin of eukaryotes in light of metabolic versatility among Asgard archaea. (15-18.04.2018). Janelia Meeting on New Opportunities to Study Origins of the Eukaryotic Cell, Ashburn, VA, USA. ***Invited Presentation***

Anja Spang. A short history of the archaea and their role in the evolution of life on Earth (2018). Final meeting of the European multidisciplinary COST-action on Life on Earth and beyond, Bertinoro, Italy. ***Invited Presentation***

Anja Spang. Symbiosis and the origin of eukaryotes: Insights from the metabolism of Asgard archaea (2018). Welcome Trust Meeting at Uppsala University, Sweden. ***Invited Presentation***

Anja Spang. Symbiosis and the origin of eukaryotes: First insights from the metabolism of Asgard archaea? (2017). Presentation as co-organizer of the Company of Biologists workshop on "Symbiosis in the microbial world: from ecology to genome evolution", *in Steyning, West Sussex, UK*. ***Presentation***

Anja Spang. Evolution of complex cells. (2017). Invited presentation of our research at the SciLifeLab International Advisory Board, Uppsala University. ***Invited Presentation***

Anja Spang. Asgard archaea illuminate the origin of eukaryotic cellular complexity (2017). Welcome Trust Meeting at UCL, London, UK. ***Invited Presentation***

Anja Spang. ASGARD – a novel archaeal superphylum unveils further secrets about the evolution of eukaryotes and sheds light onto archaeal metabolic diversity (2017). XIVth Annual UK Workshop on Archaea in Bristol. ***Presentation***

Anja Spang. ASGARD – evolution and metabolic diversity of a novel archaeal superphylum. (2016) Seminar at Microbiology section at Aarhus University. ***Invited Presentation***

Anja Spang, Thijs Ettema. The archaeal ancestry of eukaryotes. (2016) 17th Frankfurt meeting on Genome function and gene regulation in Archaea. ***Invited Presentation***

Anja Spang. Tracing the archaeal origins of eukaryotes (2016). *American Society of Microbiology ASM Microbe 2016 in Boston.* ***Invited Presentation***

Anja Spang, Jimmy H. Saw, Steffen L. Jørgensen, Katarzyna Zaremba-Niedzwiedzka, Joran Martijn, Anders E. Lind, Roel van Eijk, Christa Schleper, Lionel Guy* and Thijs J.G. Ettema* (2016). Complex archaea that bridge the gap between prokaryotes and eukaryotes. *Science contest at SciLifeLab Science Summit 2016.* ***Invited Presentation (First prize award for best research publication 2015 and talk)***

Anja Spang, Jimmy H. Saw, Steffen L. Jørgensen, Katarzyna Zaremba-Niedzwiedzka, Joran Martijn, Anders E. Lind, Roel van Eijk, Christa Schleper, Lionel Guy* and Thijs J.G. Ettema* (2015). "Lokiarchaeum, a novel deep-sea archaeon illuminates the prokaryote to eukaryote transition". *SMBE 2015 Vienna (Austria).* ***Presentation***

Anja Spang. Archaeal 'dark matter' - how metagenomics and single cell genomics revolutionize the (archaeal) tree of life. (2015) Company of Biologists *workshop on "Eukaryo-/Archaeogenesis: Where Do We Stand?" in Steyning, West Sussex, UK.* ***Invited Presentation***

Anja Spang*. (2010)* Thaumarchaeota – a Novel Archaeal Phylum that Provides Deeper Insights into the Evolution of Life on Earth. *Science Day at the University of Vienna.* ***Presentation***

Additional activities:

- Co-organizer of a Company of Biologists workshop on symbiosis in the microbial world in the UK in 2017
- Co-organizer of the session “The changing tree of life in the era of metagenomics” at the KNVM & NVMM Scientific Spring Meeting 2019 in Arnhem, Netherlands
- Selection committee for new Department at MMB, 2020 and 2021
- Representative for discussion of new science plan, NIOZ, Department for Microbiology and Biogeochemistry
- Presentation of my research at Presentation at Scientific advisory board meeting as well as international peer-review panel at NIOZ, Netherlands (2017)
- Involved in planning of a cruise to Rainbow Vent (2019) and co-organising a cruise to Iceland with Sabine Gollner, and Rick Hennekam, OCS (2021)
- Attended management and Leadership course (2018, 2019) and first sessions of a BKO training course (2021)
- Participation in a mock interview session for an ERC Starting Grant interview training of Jesus Lozano, 2022