



MORTEN OTTO ALEXANDER SOMMER

PERSONAL INFORMATION

Name: Morten Otto Alexander Sommer
Date of birth: November 12, 1981
Nationality: Danish

CURRENT POSITIONS

- Scientific Director at the Novo Nordisk Foundation Center for Biosustainability (since 2016)
- Professor and group leader in Novo Nordisk Foundation Center for Biosustainability (since 2011)
- Founder of UNION therapeutics (since 2011), Biosyntia (since 2012), Clinical-Microbiomics (since 2015), SNIPR biome (since 2017), UTILITY therapeutics (since 2018).
- Member of National Panel on Antimicrobial Resistance under the Danish Ministry of Science Technology and Innovation (since 2011)
- Member of European Expert Panel for the Joint Programming Initiative on Antimicrobial Resistance (since 2014)
- Member of the Danish Academy of Technical Sciences - ATV (since 2014)
- Board member in Biosyntia (since 2015), Clinical-Microbiomics (since 2016), UNION therapeutics (since 2016), UTILITY therapeutics (since 2018), SNIPR biome (since 2019)

PREVIOUS POSITIONS

- Professor MSO in Systems Biology at DTU (2010-2015)
- Founder and Board member of Microlytic ApS (2006-2014) – sold to Anatrace LLC
- Board member of Heed Diagnostics ApS (2011-2013), Medicon Valley Alliance (2014-2019)
- Member of Clinical Advisory Board for OpGen (2015-2019)

EDUCATION AND RESEARCH TRAINING

- B.Sc. in Physics and Biophysics from University of Copenhagen (2004), advisors: Ulrik Gether and Christian Rischel.
- M.Sc. in Physics and Biophysics from University of Copenhagen (2004), advisors: Sine Larsen and Jens Als Nielsen.
- Ph.D. in Biophysics from Harvard University (2008), advisor: George M. Church. Committee: Gary Ruvkun, Christopher Walsh, Roberto Kolter, Jon Clardy, Jack Szostak and Jim Hogle.
- Post Doctoral Research Fellow in Genetics at Harvard Medical School (2008-2010)

TEACHING AND MENTORING EXPERIENCE

- Supervised and mentored over 60 undergraduate and graduate students and post docs at Harvard Medical School and DTU.
- Currently the laboratory is comprised of 8 post docs, 14 PhD students, 1 lab manager, 1 administrative person, 2 research assistants, 1 laboratory technician and 6 Master and Bachelor students.
- Teaches antibiotic resistance in Medical Microbiology course at DTU (2010-)
- Lecturing at PhD courses in Entrepreneurship, Microbial Evolution, Protein Crystallography and Synchrotron Radiation and Nanobiology in Denmark, USA, Italy and France.

RESEARCH COLLABORATIONS WITH INDUSTRY

- 2018- Gubra (DK): Metabolic disease and microbiome
- 2018- Glycom (DK): Advanced microbiome therapeutics.
- 2012-2016 Advandx (Denmark and USA): Co-development of molecular diagnostic device for infectious disease
- 2011-2015 Novozymes (Denmark): Development of riboswitch based selections
- 2011- Davolterra (France): Limit spread of antibiotic resistance in the human gut
- 2010- Novartis (USA) and Zalacus (USA), Verily (USA): Systems approaches to fight antibiotic resistance

SELECTED HONORS AND AWARDS

- Ib Henriksens Forskerpris (2010)
- Harvard Medical School Research Fellowship in Genetics (2008-2010)
- Diplomprisen from the Hartmann Foundation (2006)
- Harvard Biophysics Scholarship (2005 – 2008)

PUBLICATIONS

H-index 33 with 5,615 citations (based on Google Scholar)

94 peer-reviewed publications

6 Books and book chapters

29 Invited oral presentations at international conferences and seminars

PATENTS AND PATENT APPLICATIONS

- (32) Sommer MOA, Toft-Kehler R, 'Combinations comprising dibromopropamide or deminazone and a tetracycline anti-bacterial agent' (2019) **Patent application**
- (31) Sommer MOA, Li P, Frandsen CH, Nielsen HM, Priemel PA, Rades T, 'Non-aqueous topical compositions comprising a halogenated salicylanilide' (2019) **US patent application**
- (30) Clube J, Sommer MOA, Grøndahl, van der Helm E, Vazquez-Urbe R, 'Selectively altering microbiota for immune modulation' (2019) US patent application
- (29) Delavenne EFA, Simon DJJ, Sommer MOA, Toft-Kehler RV, 'Antibacterial use of halogenated salicylanilides' (2019) **US patent application**
- (28) Lennen R, Nielsen AT, Herrgard M, Sommer MOA, Feist A, Mohammed ETT, 'Bacterial cells with improved tolerance to diacids' (2019) **Patent application**
- (27) Sommer MOA, Martinez V, van der Helm E, Haaber JK, de Santiago Torio A, Grøndahl C, Clube J, 'Treating and preventing microbial infections' (2018) **US patent application**
- (26) Clube J, Sommer MOA, Grøndahl C, van der Helm E, Vazquez-Urbe R, 'Altering microbial populations and modifying microbiota' (2017), US patent application
- (25) Rugbjerg P, Sarup-Lytzen K, Sommer MOA, 'A system for improved production titers in fermentations' (2017) **Patent application**
- (24) Malla S, Sommer MOA, van der Helm E, Wieschalka S, Förster J, 'A family of microbial lysine transporter polypeptides' (2017) **Patent application**
- (23) Lennen R, Nielsen AT, Herrgard M, Sommer MOA, Feist A, Mohammed ETT, 'Bacterial cells with improved tolerance to polyamines' (2017) **Patent application**
- (22) Lennen R, Nielsen AT, Herrgard M, Sommer MOA, Feist A, Mohammed ETT, 'Bacterial cells with improved tolerance to polyols' (2017) Patent application
- (21) Van Der Helm E, Sommer MOA, 'High throughput in vivo protease inhibitor selection platform' (2017) **Patent application**
- (20) Lennen R, Nielsen AT, Herrgard M, Sommer MOA, Feist A, Mohammed ETT, 'Bacterial cells with improved tolerance to isobutyric acid' (2017) **Patent application**
- (19) Genee HJ, Sommer MOA, 'Regulatable gene expression' (2016) **US Patent application**
- (18) Sommer MOA, 'Device and a method for promoting crystallisation' (2015) **US Patent application**
- (17) Church GM, Dantas G, Sommer MOA, 'Toxin-Eating Bacteria and Bioremediation' (2014) **US Patent application**
- (16) Rugbjerg P, Genee HJ, Sommer MOA 'Improved biosensor-based detection system' (2013) **Patent application**
- (15) Rugbjerg P, Genee H, Sommer MOA, 'Noise-reducing system for improved biosensor detection of a small molecule' (2013) **EU patent application.**
- (14) Genee H, Sommer MOA 'Regulatable Gene Expression' (2013) **UK patent application.**
- (13) Sommer MOA, 'Crystallization system and method for promoting crystallization' (2012) **US Patent application**
- (12) Sommer MOA, 'Crystallization media' (2010) **US patent application.**
- (11) Sommer MOA, 'X-ray channels for crystallization' (2009) **US patent application.**
- (10) Sommer MOA, 'Device for crystallization' (2009) DK and **US patent application.**
- (9) Sommer MOA et al., 'Assays and Other Reactions Involving Droplets' – (2008) **International Patent Application.**
- (8) Sommer MOA, Dantas G, Church GM, 'Metagenomic functional selections' (2008) **US patent application.**
- (7) Sommer MOA, Dantas G, Church GM, 'Toxin-eating bacteria and bioremediation' (2008) **US patent application.**
- (6) Stewart, PDS and Sommer MOA, 'Microfluidic device for thermal assays' (2007) **UK Patent application.**
- (5) Sommer MOA, 'Optical elements formed by laminar flow' - (2006) **DK patent application.**
- (4) Sommer MOA, 'A device and method for promoting crystallization' (2006) **US patent application.**
- (3) Hansen CL, Sommer MOA, Quake SR, Berger J, 'Microfluidic Protein Crystallography Techniques' (2005) **US Patent Application.**
- (2) Hansen CL, Sommer MOA, Berger J, Quake SR, 'Microfluidic Device for Combinatorial Mixing on Chip ("The Combinatorial Mixing Chip")' (2003) **US Patent Application No.: 60/447,157.**
- (1) Hansen CL, Sommer MOA, Quake SR, 'Microfluidic Protein Crystallography' (2003) **US Patent Application No.: 10/637,847.**

20 MOST RECENT PUBLICATIONS

- Zheng T, Li J, Ni Y, Kang K, Misiakou MA, Imamovic L, Chow BKC, Rode AA, Bytzer P, Sommer MOA, Panagiotou G 'Mining, analyzing, and integrating viral signals from metagenomic data', (2019) **Microbiome** – DOI: 10.1186/s40168-019-0657-y
- Ahmed MN, Porse A, Abdelsamed H, Sommer MOA, Høiby N, Ciofu O 'Lack of the major multifunctional catalase KatA in *Paeruginosa* accelerates evolution of antibiotic resistance in ciprofloxacin-treated biofilms' (2019) **Journal of Cystic Fibrosis** – DOI: 10.1128/ACC.00766-19
- Rugbjerg P, Sommer MOA, 'Overcoming genetic heterogeneity in industrial fermentations' (2019) **Nature Biotechnology** - DOI:10.1038/s41587-019-0171-6
- Prodan A, Sommer MOA, Nieuwdrop M 'Rapid diagnosis of lung infections' (2019) **Nature Biotechnology** - DOI:10.1038/s41587-019-0174-3
- Li J, Rettedal EA, van der Helm E, Ellabaan M, Panagiotou G, Sommer MOA 'Antibiotic Treatment Drives the Diversification of the Human Gut Resistome' (2019) **Genomics Proteomics Bioinformatics** – DOI: 10.1016/j.gpb.2018.12.003
- Buerger J, Gronenberg LS, Genee HJ, Sommer MOA 'Wiring cell growth to product formation' (2019) **Current Opinion Biotechnology** - DOI:10.1016/j.copbio.2019.02.014
- Klausen MS, Jespersen MC, Nielsen H, Jensen KK, Jurtz VI, Soenderby CK, Sommer MOA, Winther O, Nielsen M, Petersen B, Marcateli P 'NetSurfP -2.0: Improved prediction of protein structural features by integrated deep learning' (2019) **Proteins** - DOI:10.1002/prot.25674
- Uribe RV, van der Helm E, Misiakou M-A, Lee S-A, Kol S, Sommer MOA 'Discovery and Characterization of Cas9 Inhibitors Disseminated across Seven Bacterial Phyla' (2019) **Cell Host & Microbe** - DOI:10.1016/j.chom.2019.01.003
- Rosenkilde CHE, Munck C, Porse A, Linkevicius M, Andersson DI, Sommer MOA 'Collateral sensitivity constrains resistance evolution of the CTX-M-15 β -lactamase' (2019) **Nature Communications** - DOI:10.1038/s41467-019-08529-y
- Lino FSdO, Basso TO, Sommer MOA 'A synthetic medium to simulate sugarcane molasses' (2018) **Biotechnology for Biofuels** - DOI:10.1186/s13068-018-1221-x
- Kang K, Ni Y, Li J, Imamovic L, Sarkar C, Kobler MD, Heshiki Y, Zheng T, Kumari S, Wong JCY, Archana A, Wong CWM, Dingle C, Denizen S, Baker DM, Sommer MOA, Webster CJ, Panagiotou G. 'The environmental Exposures and Inner- and Intercity Traffic Flows of the Metro System May Contribute to the Skin Microbiome and Resistome' (2018) **Cell Reports** - DOI:10.1016/j.celrep.2018.06.109
- van der Helm, E., Genee, H.J., Sommer MOA 'The evolving interface between synthetic biology and functional metagenomics' (2018) **Nature Chemical Biology** - DOI:10.1038/s41589-018-0100-x
- Crofts TS, Wang B, Spivak A, Gianoulis TA, Forsberg KJ, Gibson MK, Johnsky LA, Broomall SM, Rosenzweig CN, Skowronski EW, Gibbons HS, Sommer MOA, Dantas G 'Shared strategies for β -lactam catabolism in the soil microbiome' (2019) **Nature Chemical Biology** - DOI:10.1038/s41589-018-0052-1
- Ahmed MN, Porse A, Sommer MOA, Høiby N, Ciofu O. 'Evolution of Antibiotic Resistance in Biofilm and Planktonic *Pseudomonas aeruginosa* Populations Exposed to Subinhibitory Levels of Ciprofloxacin' (2018) **AAC** - DOI:10.1128/AAC.00320-18
- Jahn LJ, Porse A, Munck C, Simon D, Volkova S, Sommer MOA. 'Chromosomal barcoding as a tool for multiplexed phenotypic characterization of laboratory evolved lineages' (2018) **Scientific reports** - DOI:10.1038/141598-018-25201-5
- Rugbjerg P, Sarup-Lytsen K, Nagy M, Sommer MOA 'Synthetic addiction extends the productive life time of engineered *Escherichia coli* populations' (2018) **PNAS**, DOI: 10.1073/pnas.1718622115
- Bali AP, Genee HJ, Sommer MOA, 'Directed Evolution of Membrane Transport Using Synthetic Selections', (2018) **ACS Synthetic Biology** – DOI: 10.1021/acessynbion.7b004074
- Rugbjerg P, Myling-Petersen N, Porse A, Sarup-Lytsen K, Sommer MOA 'Diverse genetic error modes constrain large-scale bio-based production' (2018) **Nature Communications**, DOI: 10.1038/s1467-018-03232-w
- Porse A, Schou T.S, Munck C, Ellbaan M.M.H, Sommer MOA 'Biochemical mechanisms determine the functional compatibility of heterologous genes' (2018) **Nature Communications**, DOI: 10.1038/s41467-018-02944-3
- Imamovic, L., Misiakou, M-A., van der Helm, E., Panagiotou, G., Muniesa, M. & Sommer, MOA 'Complete Genome Sequence of *Escherichia coli* Strain WG5' (2018) **Genome Announcements**, DOI: 10.1128/genomeA.01403-17