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Guest Researcher, Assistant Professor
Bacteriology
Bacteriology
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Short presentation

So far, my research focus has been to resolve how structure/function relationships affect the optical and chemical microenvironment in microbial communities as well as in animal and plant tissues. I have a strong expertise in different sensor techniques such as electrochemical microsensors, nanoparticle- and fiber-based optical sensors, and advanced fluorescence microscopy. I have strong experience in both theoretical and practical aspects of chemical and optical sensing, from development to field-testing of novel sensors, and the development of new experimental setups and methodologies. During my PhD, the focus was to characterize chemical microenvironments and understand microscale chemical processes in aquatic photosynthetic tissues and complex microbial biofilms. I now focus on investigating the heterogeneity of chemical landscapes in and between biofilm aggregates to elucidate interactions between the chemical microenvironment and the physiology of bacteria.

Employment

Assistant Professor

Bacteriology

København N.

31 Dec 2017 → nu

Guest Researcher

Bacteriology

København N.

1 Apr 2024 → nu

Assistant Professor

Bacteriology

København N.

1 Jan 2018 → 31 Mar 2024

Research Assistant

Marine Biology

Helsingør, Denmark

1 Oct 2016 → 31 Dec 2016

Research outputs

Novel sampling technique maintaining the two-dimensional organization of microbes during cultivation from chronic wounds: The Imprint method

Iversen, A. K. S., Fritz, Blaine Gabriel, Hansen, M. J., Kirketerp-Møller, K., Jakobsen, Tim Holm, Bjarnsholt, Thomas & Lichtenberg, Mads, 2024, (E-pub ahead of print) In: APMIS.

Single cells and bacterial biofilm populations in chronic wound infections

Lichtenberg, Mads, Kirketerp-Møller, K., Kvich, Lasse Andersson, Christensen, Mads Holm, Fritz, Blaine Gabriel, Jakobsen, Tim Holm & Bjarnsholt, Thomas, 2024, (E-pub ahead of print) In: APMIS.

A collagen-based layered chronic wound biofilm model for testing antimicrobial wound products

Thaarup, Ida Clement, Lichtenberg, Mads, Nørgaard, K. T. H., Xu, Y., Lorenzen, J., Thomsen, T. R. & Bjarnsholt, Thomas, 2023, In: Wound Repair and Regeneration. 31, 4, p. 500-515

Adaptation of *Pseudomonas aeruginosa* biofilms to tobramycin and the quorum sensing inhibitor C-30 during experimental evolution requires multiple genotypic and phenotypic changes

Bové, M., Kolpen, Mette, Lichtenberg, Mads, Bjarnsholt, Thomas & Coenye, T., 2023, In: Microbiology (United Kingdom). 169, 1, 001278.

Pharmacokinetics of Locally Applied Antibiotic Prophylaxis for Implant-Based Breast Reconstruction

Hemmingsen, Mathilde Nejrup, Bennedsen, A. K., Kullab, R. B., Norlin, C. B., Ørholt, M., Larsen, A., Bue, M., Lichtenberg, Mads, Hertz, Frederik Boëtius, Damsgaard, T. E., Vester-Glowinski, Peter Viktor, Sørensen, Søren Johannes, Bjarnsholt, Thomas & Herly, Mikkel, 2023, In: JAMA network open. 6, 12, 11 p., E2348414.

Protocol to assess metabolic activity of *Pseudomonas aeruginosa* by measuring heat flow using isothermal calorimetry

Beilharz, K., Kragh, K. N., Fritz, Blaine Gabriel, Kirkegaard, Julius Bier, Tolker-Nielsen, Tim, Bjarnsholt, Thomas & Lichtenberg, Mads, 2023, In: STAR Protocols. 4, 2, 102269.

Rethinking the Inoculum Used in Animal Models of Implant-Associated Osteomyelitis – The Formation and Application of Bacterial Aggregates

Hartmann, Katrine Top, Nielsen, R. L., Mikkelsen, F. C., Ingmer, Hanne, Kvich, Lasse Andersson, Aalbæk, Bent, Odgaard, Anders, Jensen, Henrik Elvang, Lichtenberg, Mads, Bjarnsholt, Thomas & Jensen, Louise Kruse, 2023, p. 59. 1 p.

The non-attached biofilm aggregate

Kragh, K. N., Tolker-Nielsen, Tim & Lichtenberg, Mads, 2023, In: Communications Biology . 6, 898.

What's in a name? Characteristics of clinical biofilms

Lichtenberg, Mads, Coenye, T., Parsek, M. R., Bjarnsholt, Thomas & Jakobsen, Tim Holm, 2023, In: FEMS Microbiology Reviews. 47, 5, p. 1-8 fuad050.

Biofilm Survival Strategies in Chronic Wounds

Thaarup, Ida Clement, Iversen, A. K. S., Lichtenberg, Mads, Bjarnsholt, Thomas & Jakobsen, Tim Holm, 2022, In: Microorganisms. 10, 4, 775.

Cyclic-di-GMP signaling controls metabolic activity in *Pseudomonas aeruginosa*

Lichtenberg, Mads, Kragh, K. N., Fritz, Blaine Gabriel, Kirkegaard, Julius Bier, Tolker-Nielsen, Tim & Bjarnsholt, Thomas, 2022, In: Cell Reports. 41, 3, p. 111515 1 p.

Inoculum Concentration Influences *Pseudomonas aeruginosa* Phenotype and Biofilm Architecture

Lichtenberg, Mads, Kvich, Lasse Andersson, Larsen, S. L. B., Jakobsen, Tim Holm & Bjarnsholt, Thomas, 2022, In: Microbiology Spectrum. 10, 6

The structure-function relationship of *Pseudomonas aeruginosa* in infections and its influence on the microenvironment

Lichtenberg, Mads, Jakobsen, Tim Holm, Kühn, Michael, Kolpen, Mette, Jensen, Peter Østrup & Bjarnsholt, Thomas, 2022, In: FEMS Microbiology Reviews. 46, 5, 13 p., fuac018.

Catalase protects biofilm of *Staphylococcus aureus* against daptomycin activity

El Haj, C., Lichtenberg, Mads, Nielsen, K. L., Bjarnsholt, Thomas & Jensen, Peter Østrup, 2021, In: Antibiotics. 10, 5, 511.

In-Situ Metatranscriptomic Analyses Reveal the Metabolic Flexibility of the Thermophilic Anoxygenic Photosynthetic Bacterium *Chloroflexus aggregans* in a Hot Spring Cyanobacteria-Dominated Microbial Mat

Kawai, S., Martinez, J. N., Lichtenberg, Mads, Trampe, Erik, Kühl, Michael, Tank, M., Haruta, S., Nishihara, A., Hanada, S. & Thiel, V., 2021, In: *Microorganisms*. 9, 3, 22 p., 652.

Nitric-oxide-driven oxygen release in anoxic *Pseudomonas aeruginosa*

Lichtenberg, Mads, Line, L., Schrameyer, V., Jakobsen, Tim Holm, Rybtke, Morten Levin, Toyofuku, M., Nomura, N., Kolpen, Mette, Tolker-Nielsen, Tim, Kühl, Michael, Bjarnsholt, Thomas & Jensen, Peter Østrup, 2021, In: *iScience*. 24, 12, 103404.

Vertical Migration Optimizes Photosynthetic Efficiency of Motile Cyanobacteria in a Coastal Microbial Mat

Lichtenberg, Mads, Cartaxana, P. & Kühl, Michael, 25 May 2020, In: *Frontiers in Marine Science*. 7, 13 p., 359.

Lactobacillus rhamnosus* strains of oral and vaginal origin show strong antifungal activity *in vitro

Jørgensen, Mette Rose, Rikvold, P. T., Lichtenberg, Mads, Jensen, Peter Østrup, Kragelund, C. & Twetman, Svante, 2020, In: *Journal of Oral Microbiology*. 12, 1, 8 p., 1832832.

Do Mixed-Species Biofilms Dominate in Chronic Infections? Need for in situ Visualization of Bacterial Organization

Kvich, Lasse Andersson, Burmølle, Mette, Bjarnsholt, Thomas & Lichtenberg, Mads, 2020, In: *Frontiers in Cellular and Infection Microbiology*. 10, 12 p., 396.

In Situ Monitoring of the Antibacterial Activity of a Copper-Silver Alloy Using Confocal Laser Scanning Microscopy and pH Microsensors

Ciacotich, N., Kragh, K. N., Lichtenberg, Mads, Tesdorpf, J. E., Bjarnsholt, Thomas & Gram, L., 2019, In: *Global Challenges*. 3, 11, 9 p., 1900044.

Optical Properties of Corals Distort Variable Chlorophyll Fluorescence Measurements

Wangpraseurt, D., Lichtenberg, Mads, Jacques, S. L., Larkum, A. W. D. & Kühl, Michael, 2019, In: *Plant Physiology*. 179, 4, p. 1608-1619

Vertical Distribution and Diversity of Phototrophic Bacteria within a Hot Spring Microbial Mat (Nakabusa Hot Springs, Japan)

Martinez, J. N., Nishihara, A., Lichtenberg, Mads, Trampe, Erik, Kawai, S., Tank, M., Kühl, Michael, Hanada, S. & Thiel, V., 2019, In: *Microbes and Environments*. 34, 4, p. 374-387 14 p.

Photosynthesis and Metabolism of Seagrasses

Larkum, A. W. D., Pernice, M., Schliep, M., Davey, P., Szabo, M., Raven, J. A., Lichtenberg, Mads, Brodersen, Kasper Elgetti & Ralph, P. J., 2018, *Seagrasses of Australia: Structure, Ecology and Conservation*. Larkum, A. W. D., Kendrick, G. A. & Ralph, P. J. (eds.). Springer, p. 315-342

Light sheet microscopy imaging of light absorption and photosynthesis distribution in plant tissue

Lichtenberg, Mads, Trampe, Erik, Vogelmann, T. C. & Kühl, Michael, Oct 2017, In: *Plant Physiology*. 175, p. 721-733 13 p.

Radiative energy budgets of phototrophic surface-associated microbial communities and their photosynthetic efficiency under diffuse and collimated light

Lichtenberg, Mads, Brodersen, Kasper Elgetti & Kühl, Michael, 28 Mar 2017, In: *Frontiers in Microbiology*. 8, 17 p., 452.

Diffusion or advection? Mass transfer and complex boundary layer landscapes of the brown alga *Fucus vesiculosus*

Lichtenberg, Mads, Nørregaard, R. D. & Kühl, Michael, Mar 2017, In: *Journal of the Royal Society. Interface*. 14, 128, 20161015.

Microscale Canopy Interactions in Aquatic Phototrophs

Lichtenberg, Mads, 2017, Department of Biology, Faculty of Science, University of Copenhagen.

***In situ* hydrogen dynamics in a hot spring microbial mat during a diel cycle**

Revsbech, N. P., Trampe, Erik, Lichtenberg, Mads, Ward, D. M. & Kühl, Michael, 2016, In: Applied and Environmental Microbiology. 82, 14, p. 4209-4217 9 p.

Fiber-optic probes for small scale measurements of scalar irradiance

Rickelt, L. F., Lichtenberg, Mads, Trampe, Erik & Kühl, Michael, 2016, In: Photochemistry and Photobiology. 92, 2, p. 331-342 12 p.

Nanoparticle-based measurements of pH and O₂ dynamics in the rhizosphere of *Zostera marina* L. effects of temperature elevation and light-dark transitions

Brodersen, Kasper Elgetti, Koren, K., Lichtenberg, Mads & Kühl, Michael, 2016, In: Plant, Cell and Environment. 39, 7, p. 1619-1630 12 p.

Photosynthetic acclimation of *Symbiodinium in hospite* depends on vertical position in the tissue of the scleractinian coral *Montastrea curta*

Lichtenberg, Mads, Larkum, A. W. D. & Kühl, Michael, 2016, In: Frontiers in Microbiology. 7, 13 p., 230.

Epiphyte-cover on seagrass (*Zostera marina* L.) leaves impedes plant performance and radial O₂ loss from the below-ground tissue

Brodersen, Kasper Elgetti, Lichtenberg, Mads, Paz, L. & Kühl, Michael, 2015, In: Frontiers in Marine Science. 2, 11 p., 58.

Pronounced gradients of light, photosynthesis and O₂ consumption in the tissue of the brown alga *Fucus serratus*

Lichtenberg, Mads & Kühl, Michael, 2015, In: New Phytologist. 207, p. 559-569 11 p.

Radiative energy budget reveals high photosynthetic efficiency in symbiont-bearing corals

Brodersen, Kasper Elgetti, Lichtenberg, Mads, Ralph, P. J., Kühl, Michael & Wangpraseurt, D., 2014, In: Journal of the Royal Society. Interface. 11, 93, 11 p., 20130997.

Biology of a high-density population of *Stichopus herrmanni* at One Tree Reef, Great Barrier Reef, Australia

Lichtenberg, Mads, 2010, In: SPC Beche-de-mer Information Bulletin 30: 41-45.