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Research

I have worked in the field of physical chemical characterisation of proteins since 1987. First as a PhD and research assistant working with protein adsorption to solid surfaces and the influence of other surface active components on this. After this I worked with oral and parenteral delivery of pharmaceutical peptides, in the capacity as head of formulation at Ferring AB. Upon my return to the University I have broadened the scope of delivery problems that I work with I have been involved in research endeavours often together with industry partners dealing with controlled delivery of both biological and traditional drugs. When it comes to protein delivery the focus has been on depo-formulations and recently on protein/surfactant interactions. For the traditional drugs most of the focus has been in using hydrogels both classical ones and hydrophobically modified ones for controlled delivery of lipophilic substances. An important part of this work is to investigate the physicochemical properties of the gels, including rheological properties. I am also involved in projects related to Pickering emulsions and primarily their use in formulations for topical creams. I have had several collaborations with pharmaceutical companies especially through diploma workers but also in research collaborations. The companies include Ferring, AstraZeneca, McNeal, Bioglan, Bonesupport, Biogaia Zelmic technology, Nycomedpharma, Leopharma, and NovoNordisk.

Employment

Office director, Professor

Division of Food and Pharma
Lund University
Lund, Sweden
2015 Sept 21 → present

Deputy head of department

Department of Process and Life Science Engineering
Lund University
Lund, Sweden
2024 Jan 3 → present

Profile area member

LTH Profile Area: Engineering Health
Lund University
Sweden
2024 Jun 17 → present

Profile area member

LTH Profile Area: Food and Bio
Lund University
Sweden
2024 Sept 16 → present

Riksdagsledamot

Swedish Parliament
Stockholm, Sweden
2002 Jan 1 → 2006 Jan 1

Head Pharmaceutical department

Ferring AB
Copenhagen, Denmark
1997 Oct 1 → 2000 Jul 30

Ferring AB, Malmö Group manager Peroral group

Ferring AB
Copenhagen, Denmark
1997 Apr 1 → 1997 Dec 30

Research output

Starch microsphere preparation and phase behaviour in aqueous two-phase systems – effect of continuous-phase polymer

Gidlöf, Z., Andersson, J., Nilsson, L., Nordström, R., Wahlgren, M. C. & Millqvist-Fureby, A., 2026 Mar, In: Food Hydrocolloids. 171, 111832.

Investigating the dynamics of freeze-drying and annealing using in-situ synchrotron X-ray microtomography

Palmkron, S. B., Engqvist, J., Bolinsson, H., Bergenståhl, B., Hall, S., McDonald, S., Wahlgren, M., Larsson, E. & Fureby, A. M., 2025 Dec, In: Food Hydrocolloids. 168, 111465.

The effect of glycerol and protein structure on chemical degradation through deamidation and isomerization

Ramm, I., Diehl, C., Västberg, A., Markova, N., Schagerlöf, H., Wahlgren, M. & Nilsson, L., 2025 Dec, In: International Journal of Pharmaceutics. 686, 126322.

Ethylcellulose oleogel as a prolonged release delivery system for probiotics. Development and validation of a cold-mixing method

Zhang, L., Wahlgren, M., Oscarsson, E. & Bergenståhl, B., 2025 Oct, In: Food Hydrocolloids. 166, 111339.

Kinetics of Formation of Starch Microspheres Produced Using Aqueous Two-Phase Systems With Different Polymers in the Continuous Phase

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Excipient effect on phenol-induced precipitation of human growth hormone and bovine serum albumin

Hjalte, J., Börjesdotter, A. M., Diehl, C., Ulvenlund, S., Wahlgren, M. & Sjögren, H., 2025 May, In: International Journal of Pharmaceutics. 676, 125624.

Interactions between polysorbate and antimicrobial preservatives in aqueous parenteral products

Wahlgren, M., Börjesdotter, A.-M., Hjalte, J., Martín, J. L., Zhang, L., Sjögren, H. & Ulvenlund, S., 2025 May, In: Journal of Drug Delivery Science and Technology. 107, 7 p., 106765.

Pneumatic tube transport of trastuzumab in IV bags—Effect of headspace and surfactant on subvisible particle formation

Kjellström, A., Cederwall, I., Martínez, C. S., Kwok, S., Rosenthal, F., Elofsson, U., Paulsson, M. & Wahlgren, M., 2025 Feb, In: Journal of Pharmaceutical Sciences. 114, 2, p. 1142-1151 10 p.

Exploring industry stakeholder perspectives on a clinical testbed for evaluating the handling of protein drugs in hospitals

Arvidsson, J., Alkhatib, Y., Egen, M., Elofsson, U., Millqvist, A. F., López-Cabezas, C., Wahlgren, M., Rosenberger, M. & Paulsson, M., 2025, In: Journal of Pharmaceutical Sciences. 114, 4, 10 p., 103704.

Particle formation during peristaltic pumping of therapeutic proteins: Hofmeister anions effect

Västberg, A., Markova, N., Nilsson, L., Nylander, T., Sivakumar, B., Wahlgren, M. & Elofsson, U., 2025, In: *Journal of Pharmaceutical Sciences*. 114, 4, 6 p., 103700.

How are we handling protein drugs in hospitals? A human factors and systems engineering approach to compare two hospitals and suggest a best practice

Sabaté-Martínez, C., Paulsson, M., González-Suárez, S., Elofsson, U., Millqvist Fureby, A., Wahlgren, M. & López-Cabezas, C., 2024 Jan 1, In: *International Journal for Quality in Health Care*. 36, 1, mzae020.

The use of starch microspheres and nanoparticles in pharmaceutical applications

Fureby, A. M., Gidlöf, Z. & Wahlgren, M., 2024 Jan 1, *Starch in Food: Structure, Function, and Applications*. Nilsson, L. (ed.). Third Edition ed. Elsevier, p. 487-501 15 p.

Impact of Post Manufacturing Handling of Protein-Based Biologic Drugs on Product Quality and User Centricity

Cappelletto, E., Kwok, S. C., Sorret, L., Fuentes, N., Medina, A., Burleigh, S., Fast, J., Mackenzie, I. S., Fureby, A. M., Paulsson, M., Wahlgren, M., Elofsson, U., Flynn, A., Miolo, G., Nyström, L., De Laureto, P. P. & De Paoli, G., 2024, In: *Journal of Pharmaceutical Sciences*. 113, 8, p. 2055-2064 10 p.

Modulating protein unfolding and refolding via the synergistic association of an anionic and a nonionic surfactant

Hjalte, J., Diehl, C., Leung, A. E., Poon, J. F., Porcar, L., Dalgliesh, R., Sjögren, H., Wahlgren, M. & Sanchez-Fernandez, A., 2024, In: *Journal of Colloid and Interface Science*. 672, p. 244-255 12 p.

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Examination of the Protein Drug Supply Chain in a Swedish University Hospital: Focus on Handling Risks and Mitigation Measures

Martínez, C. S., Amery, L., De Paoli, G., Elofsson, U., Fureby, A. M., Kwok, S., López-Cabezas, C., Rosenberger, M., Schoenau, C., Wahlgren, M. & Paulsson, M., 2023 Nov, In: *Journal of Pharmaceutical Sciences*. 112, 11, p. 2799-2810 12 p.

Realizing the AF4-UV-SAXS on-line coupling on protein and antibodies using high flux synchrotron radiation at the CoSAXS beamline, MAX IV

Bolinsson, H., Söderberg, C., Herranz-Trillo, F., Wahlgren, M. & Nilsson, L., 2023 Oct, In: *Analytical and Bioanalytical Chemistry*. 415, 25, p. 6237-6246 10 p.

Quantification of structures in freeze-dried materials using X-ray microtomography

Bai Palmkron, S., Bergenståhl, B., Håkansson, S., Wahlgren, M., Fureby, A. M. & Larsson, E., 2023 Feb 5, In: *Colloids and Surfaces A: Physicochemical and Engineering Aspects*. 658, 130726.

Utilising phase diagram to understand barley starch microsphere preparation in an aqueous two-phase system

Gidlöf, Z., Lomstein Pedersen, B., Nilsson, L., Teleman, A., Wahlgren, M. & Millqvist-Fureby, A., 2023 Feb 5, In: *Colloids and Surfaces A: Physicochemical and Engineering Aspects*. 658, 130652.

Charge and zeta-potential distribution in starch modified with octenyl succinic anhydride (OSA) determined using electrical asymmetrical flow field-flow fractionation (EAF4)

Fuentes, C., Choi, J., Wahlgren, M. & Nilsson, L., 2023 Jan, In: *Colloids and Surfaces A: Physicochemical and Engineering Aspects*. 657, 130570.

Investigating thermally induced aggregation of Somatropin- new insights using orthogonal techniques

Västberg, A., Bolinsson, H., Leeman, M., Nilsson, L., Nylander, T., Sejwal, K., Sintorn, I. M., Lidayová, K., Sjögren, H., Wahlgren, M. & Elofsson, U., 2023, In: *International Journal of Pharmaceutics*. 637, 122829.

Deep eutectic solvents for the preservation of concentrated proteins: the case of lysozyme in 1 : 2 choline chloride : glycerol

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Aggregation Behavior of Structurally Similar Therapeutic Peptides Investigated by ¹H NMR and All-Atom Molecular Dynamics Simulations

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Tactile friction of topical creams and emulsions: Friction measurements on excised skin and VitroSkin® using ForceBoard™

Ali, A., Ringstad, L., Skedung, L., Falkman, P., Wahlgren, M. & Engblom, J., 2022 Mar 5, In: International Journal of Pharmaceutics. 615, 121502.

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Shear-induced nanostructural changes in micelles formed by sugar-based surfactants with varied anomeric configuration

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Oil-Based Delivery Control Release System Targeted to the Later Part of the Gastrointestinal Tract—A Mechanistic Study

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Temperature and Heat Transfer Control During Freeze Drying. Effect of Vial Holders and Influence of Pressure

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Topological Dynamics of Micelles Formed by Geometrically Varied Surfactants

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Tail unsaturation tailors the thermodynamics and rheology of a self-assembled sugar-based surfactant

Larsson, J., Leung, A. E., Lang, C., Wu, B., Wahlgren, M., Nylander, T., Ulvenlund, S. & Sanchez-Fernandez, A., 2021 Mar, In: Journal of Colloid and Interface Science. 585, p. 178-183 6 p.

Molecular structure of maltoside surfactants controls micelle formation and rheological behavior

Larsson, J., Sanchez-Fernandez, A., Leung, A. E., Schweins, R., Wu, B., Nylander, T., Ulvenlund, S. & Wahlgren, M., 2021 Jan 1, In: Journal of Colloid and Interface Science. 581, p. 895-904 10 p.

Capturing progression of formal knowledge and employability skills by monitoring case discussions in class

Ramberg, U., Edgren, G. & Wahlgren, M., 2021, In: Teaching in Higher Education. 26, 2, p. 246-264

Characterization of binding between model protein GA-Z and human serum albumin using asymmetrical flow field-flow fractionation and small angle X-ray scattering

Choi, J., Wahlgren, M., Ek, V., Elofsson, U., Fransson, J., Nilsson, L., Terry, A. & Söderberg, C. A. G., 2020 Nov, In: PLoS ONE. 15, 11 November, 19 p., e0242605.

An integrative toolbox to unlock the structure and dynamics of protein-surfactant complexes

Sanchez-Fernandez, A., Diehl, C., Houston, J. E., Leung, A. E., Tellam, J. P., Rogers, S. E., Prevost, S., Ulvenlund, S., Sjögren, H. & Wahlgren, M., 2020, In: Nanoscale Advances. 2, 9, p. 4011-4023 13 p.

Separation and zeta-potential determination of proteins and their oligomers using electrical asymmetrical flow field-flow fractionation (EAF4)

Choi, J., Fuentes, C., Fransson, J., Wahlgren, M. & Nilsson, L., 2020, In: Journal of Chromatography A. 1633, 461625.

Effects of starch granules differing in size and morphology from different botanical sources and their mixtures on the characteristics of Pickering emulsions

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In vitro methods to study colon release: State of the art and an outlook on new strategies for better in-vitro biorelevant release media

Wahlgren, M., Axenstrand, M., Håkansson, Å., Marefati, A. & Pedersen, B. L., 2019 Feb 22, In: Pharmaceutics. 11, 2, 95.

A comparison of emulsion stability for different OSA-modified waxy maize emulsifiers: Granules, dissolved starch, and non-solvent precipitates

Saari, H., Wahlgren, M., Rayner, M., Sjöo, M. & Matos, M., 2019 Feb 1, In: PLoS ONE. 14, 2, e0210690.

Dehydration affects drug transport over nasal mucosa

Ali, A., Wahlgren, M., Rembratt-Svensson, B., Daftani, A., Falkman, P., Wollmer, P. & Engblom, J., 2019 Jan 1, In: Drug delivery. 26, 1, p. 831-840 10 p.

Characterization of non-solvent precipitated starch using asymmetrical flow field-flow fractionation coupled with multiple detectors

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The effect of the anomeric configuration on the micellization of hexadecylmaltoside surfactants

Larsson, J., Sanchez-Fernandez, A., Mahmoudi, N., Barnsley, L., Wahlgren, M., Nylander, T. & Ulvenlund, S., 2019, In: Langmuir. 35, 43, p. 13904-13914

Individual differences of bacterial degradation of starch in the upper gastrointestinal tract evaluated in a modified *in vitro* model

Oscarsson, E., Wahlgren, M., Agardh, D. & Håkansson, Å., 2018, In: Advances in Applied and Pharmaceutical Sciences Journal. 2, 2, p. 31-38 8 p.

Pickering emulsions based on CaCl₂-gelatinized oat starch

Saari, H., Johansson, D. B., Knopp, N., Sjöo, M., Rayner, M. & Wahlgren, M., 2018, In: Food Hydrocolloids. 82, p. 288-295 8 p.

Sifting segregation of ideal blends in a two-hopper tester: Segregation profiles and segregation magnitudes

Marucci, M., Al-Saaigh, B., Boissier, C., Wahlgren, M. & Wikström, H., 2018, In: Powder Technology. 331, p. 60-67 8 p.

Will a water gradient in oral mucosa affect transbuccal drug absorption?

Ali, A., Wahlgren, M., Pedersen, L. & Engblom, J., 2018, In: Journal of Drug Delivery Science and Technology. 48, p. 338-345 8 p.

Production of starch nanoparticles by dissolution and non-solvent precipitation for use in food-grade Pickering emulsions
Saari, H., Fuentes, C., Sjöo, M., Rayner, M. & Wahlgren, M., 2017 Feb 10, In: Carbohydrate Polymers. 157, p. 558-566 9 p.

Comparative Emulsifying Properties of Octenyl Succinic Anhydride (OSA)-Modified Starch: Granular Form vs Dissolved State

Matos González, M., Marefati, A., Gutiérrez, G., Wahlgren, M. & Rayner, M., 2016 Aug 1, In: PLoS ONE. 11, 8, p. e0160140 0160140.

Preparation and Characterization of Starch Particles for Use in Pickering Emulsions

Saari, H., Heravifar, K., Rayner, M., Wahlgren, M. & Sjöo, M., 2016, In: Cereal Chemistry. 93, 2, p. 116-124

Formulation of emulsions

Wahlgren, M., Bergenståhl, B., Nilsson, L. & Rayner, M., 2015 Jan 1, *Engineering Aspects of Food Emulsification and Homogenization*. Rayner, M. & Dejmek, P. (eds.). CRC Press, p. 51-100 50 p.

Particle-stabilized emulsions

Sjöo, M., Rayner, M. & Wahlgren, M., 2015 Jan 1, *Engineering Aspects of Food Emulsification and Homogenization*. Rayner, M. & Dejmek, P. (eds.). CRC Press, p. 101-122 22 p.

Amperometric In Vitro Monitoring of Penetration through Skin Membrane

Gari, H., Rembiesa, J., Masilionis, I., Vreva, N., Svensson, B., Sund, T., Hansson, H., Moren, A. K., Sjöo, M., Wahlgren, M., Engblom, J. & Ruzgas, T., 2015, In: Electroanalysis. 27, 1, p. 111-117

Barrier properties of heat treated starch Pickering emulsions.

Sjöo, M., Emek, S. C., Hall, T., Rayner, M. & Wahlgren, M., 2015, In: Journal of Colloid and Interface Science. 450, p. 182-188

Do surface active parenteral formulations cause inflammation?

Söderberg, L., Engblom, J., Lanbeck, P. & Wahlgren, M., 2015, In: International Journal of Pharmaceutics. 484, 1-2, p. 246-251

Release of a Poorly Soluble Drug from Hydrophobically Modified Poly (Acrylic Acid) in Simulated Intestinal Fluids.

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Biomass-based particles for the formulation of Pickering type emulsions in food and topical applications

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Effects of Added Surfactant on Swelling and Molecular Transport in Drug-Loaded Tablets Based on Hydrophobically Modified Poly(acrylic acid)

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Wahlgren, M., Engblom, J., Sjöo, M. & Rayner, M., 2014, In: Current Pharmaceutical Biotechnology. 14, 15, p. 1222-1234

Monitoring and stimulating development of integrated professional skills in university study programmes

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Using NMR Chemical Shift Imaging To Monitor Swelling and Molecular Transport in Drug-Loaded Tablets of Hydrophobically Modified Poly(acrylic acid): Methodology and Effects of Polymer (In)solubility

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Using observed student team problem solving to monitor and stimulate development of complex integrated professional skills

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Assessing progression in engineering study programs

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Curriculum building and student progression in two LTH engineering study programmes

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The effects of lipophilic substances on the shape of erythrocytes demonstrated by a new in vitro-method

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Vad är en civilingenjör och hur blir studenter civilingenjörer?

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Rundabordsamtal: Är det skillnad att utbilda naturvetare och tekniker?

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En genomgång av laborativa moment i de obligatoriska kurserna på kemiteknikprogrammets första tre år

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Activities

Engineering Scandinavian Crop and Residual Streams into Novel Food Analogues

Purhagen, J. (Joint first/primary/lead supervisor), Wahlgren, M. (First/primary/lead supervisor), Rayner, M. (Supervisory team member), Vilaplana, F. (Supervisory team member) & Östbring, K. (Second supervisor)

2025 Sept 1 → 2029 Aug 31

FORMULATION TECHNOLOGY IN PHARMACEUTICS, NUTRACEUTICS AND COSMETICS

Wahlgren, M. (Participant)

2016 Oct 10

Powder Technology in Pharma, Food and Chemistry

Wahlgren, M. (Contributor)

2013 → 2020

Awards

Molekylär förståelse för formulering av nya biologiska läkemedel

Wahlgren, M. (PI)

Swedish Government Agency for Innovation Systems (Vinnova): SEK1,000,000.00
2025/11/24 → 2026/11/30