

1. Contact information, including researcher IDs (for example ORCID, Scopus ID)

Name: Patrick Donald Sinko

Date of birth: 1991-04-07

Gender: Male

Workplace address, phone number and email address:

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2. **Work experience** (Current and previous employments)

2025-09-01 – present

Guest Researcher at the Division of Chemical Biology in the Department of Life sciences with Alexandra Stubelius Laboratory

2022-01-01 -present

Forskare (Researcher), Molekylär Galenisk Farmaci, Institutionen för farmaci, Uppsala Universitet, organisationsnummer 202100-2932.

2019-2021 Postdoctoral research fellow, Molecular Pharmaceutics Group (Christel A.S. Bergström, PhD)

2015 Summer Science Intern Abbvie, Drug Product Development Lake County, IL

2013 Associate Investigator DuPont Engineering Research and Technology, Experimental Station, Wilmington, DE

2012 Undergraduate Researcher Princeton University, Princeton, NJ; Princeton Institute for the Science and Technology of Materials' / Princeton Center for Complex Materials

2010-2012 Summer/Winter Research Intern Bristol-Myers Squibb, New Brunswick, NJ

3. Educational qualifications (including educational degree, date, university, program, name of supervisor)

- 2019-08-20 Doctor of Philosophy in Pharmaceutical Sciences, University of Michigan, Ann Arbor, MI, Gordon L. Amidon and Gregory E. Amidon.
- 2018-04-26 Masters of Science in Engineering in Materials Science and Engineering, University of Michigan, Ann Arbor, MI
- 2015-12-23 Masters of Science in Engineering in Pharmaceutical Sciences, University of Michigan, Ann Arbor, MI
- 2013-05-18 Bachelors of Science in Material Sciences Engineering Minor: Naval-Civilian Leadership, Virginia Tech Corps Cadets, Naval-ROTC. Virginia Polytechnic Institute and State University (Virginia Tech), Blacksburg VA.

4. Deductible time (for example parental and extended sick leave, if relevant)

- 2024 Parental Leave for Second Child (2024-04-02 to 2024-08-04)
- 2021 Parental Leave for First Child (2021-03-29 to 2021-07-30)

5. Research grants (including funding agency, time period, amounts and role as e.g., principle investigator (PI) or co-PI)

- 2024-2025 **Forska Utan Djurförsök**, Grant N2023-0009, A miniaturized gut for optimization of oral medicines.

Award: 250,000 sek

Principle Investigator: **Patrick D. Sinko**

Co-investigator: Christel A.S. Bergström, Co-Investigator: Maria Karlgren).

I initiated and wrote the initial application draft in whole. I shared this draft with my co-investigators for feedback and suggestions, which I then integrated their feedback into the final application.

- 2024–2026 **Swedish Research Council (Vetenskapsrådet)** Grant: 2023–02916, entitled:” En småskalig modell av tarmen för optimering av orala läkemedel”.

Award: 2,200,000 sek.

Principle Investigator: Christel A.S. Bergström

Co-investigator: **Patrick D. Sinko**, Co-Investigator: Maria Karlgren).

Prior to writing I was an integral part in the ideation of the project and in planning the application over multiple years of submission attempts. I wrote the first of the three subprojects, made the figures for all subprojects, helped write the third subproject, helped plan the budget, created the project timeline, reviewed and edited the whole proposal.

- 2018-2019 **Norman Weiner Graduate Fellowship**, Role: Applicant

- 2015-2018 **Abbvie Pharmaceuticals Sponsored Research Agreement contract number C99549**. Modernization of in vivo-in vitro Oral Bioperformance Prediction and Assessment: Development of an improved in vitro methodology to simulate the simultaneous dissolution and absorption of drugs.

Role: Applicant. After my research internship at Abbvie I initiated the negotiations for this agreement to provide funding for the remainder of my dissertation project.

6. Supervision experience

First Cycle Supervised Students (primary advisor):

2017-2019 Troy Halseth
2017 Sarah Harris
2017 Yue (Angel) Yuan

Second Cycle Supervised (primary advisor):

Sommarforsarskola Program, Uppsala universitet

2023-2024 Astrid Palmér

Master of Science Programme in Pharmacy, Uppsala universitet

2021 Souad Wanly
2020 Michal Asmerom

Third cycle supervision:

Uppsala universitet, 2020, SWEDeliver Funded PhD student, Doctor of Philosophy.

2022 Benjamin Naranjani, Thesis Defense Date: 2025-10-10

7. Teaching experience (including your role, course, university [if other than your current university], time period, student level, approximate number of students)

2023 – present Introduction to Laboratory Statistics for 45 credit Master's Students,
Lecturer, Second Cycle.

Number of Students per course: 5-15

I redesigned this module from a passive lecture to an active participation style experience when I took over the module. More detail is covered in the pedagogical portfolio.

2021-present Patient-Centered Drug Delivery, Lab Instructor, First Cycle.

Number of Students per course: 10-15

I helped to create and develop the laboratory aspect of this course. I helped to define the parameters that could be studied in a virtual environment from both the drug product and 3D printing perspectives. More detail is covered in the pedagogical portfolio.

2020-present Operation of the UPLC-MS/MS and UPLC-MS/MS Method
Development and Validation at the Department of Pharmacy, Lecturer
and Lab Instructor, Third Cycle

Number of Students per course: 1-5

I train PhD candidates, postdocs, and researchers in the use of the UPLC-MS/MS on a as needed basis. The basic theory, operation, and maintenance training lasts for two days, with the method development and initial validation training lasting for an additional two to three days. Students are evaluated on their proficiency to operate the instrument and follow operational guidelines during the basic training over the course of the following month.

2019- present Molecular Biopharmaceutics, Examiner, Lecturer, and Lab Instructor, First Cycle.

Number of Students per course: 30-50

I have been involved in two sections of this course in the role of examiner, lecturer, and lab teacher. More detail is covered in the pedagogical portfolio.

8. Pedagogical courses

Please see the pedagogical portfolio.

9. Invited presentations/reviews/lectures

2024 Invited Oral presentation at pion Virtual Workshop on the particle drift effect. May 7, 2024

Sinko PD, Salehi N, Halseth T, Meyer P, Amidon GL, Ziff RM, Amidon GE "Particle Size, Dose, and Confinement Affect Passive Diffusion Flux through the Membrane Concentration Boundary Layer"

2023 Invited Session Chairman for Preclinical Form and Formulation for Drug Discovery, Gordon Research Conference/Seminar June, 2023 Mount Snow in West Dover, Vermont, United States

2019 Selected Oral presentation at Preclinical Form and Formulation for Drug Discovery Gordon Research Seminar: Leveraging Advanced Characterization Methods and Novel Delivery Systems for Preclinical Drug Formulation June 8-9 Waterville Valley, New Hampshire, United States

Sinko PD "Characterization and Application of an Ultra-Thin Large Area Polydimethylsiloxane Membrane for In Vivo Relevant Dissolution Methodologies"

I am humbly including this entry in my application based on the fact that it occurred within the last five years of working time, as I have taken 9 months of parental leave during the last five chronological years.

10. Patents (if relevant)

2025 mGut: A miniaturized gut for optimization of oral medicines. Patent Pending (PCT)

2018 Characterization and Application of polymers for in vivo relevant drug absorption characterization in vitro (PCT/US2018/051605, international publication number: WO2019/060329 A1)

11. Membership of large collaborations, scientific or professional organisations etc.

I am a member of the Apotekarsocieteten (since 2019) and the American Association Pharmaceutical Scientists (since 2013).

Publications lists: Divided into peer reviewed/non peer reviewed journal articles, conference contributions, etcetera

Peer Reviewed Manuscripts submitted or in draft

- 2025 Benyamin Naranjani, Staffan Berg, Christel A S Bergström, Shakhawath Hossain, **Patrick D Sinko**, Per Larsson. *Revealing macromolecular drug absorption under the migrating motor complex: An in vivo-CFD investigation of anesthesia effects, permeation enhancement, and species variability.* (Manuscript drafted)
- 2025 Benyamin Naranjani, Shakhawath Hossain, Marco Tjakra, Pardis Azhand, Christel A S Bergström, **Patrick D Sinko**, Per Larsson. *Mechanics of Small Intestine Motility for Oral Macromolecular Delivery: Modeling Segmentation Versus Peristalsis.* (Under review since 2025-09-09 at *Drug Delivery*)
- 2025 Yael del Carmen Suárez-López, **Patrick D. Sinko**, Qianying Chen, and Alexandra Teleki. *Nanoparticles in motion: The effect of gastrointestinal fluid chemical composition on nanoparticle stability and aggregation.* (Manuscript drafted)
- 2025 Aleksei Kabedev, **Patrick D. Sinko**, Madlen Hubert, Christel A. S. Bergström. *Enhancing Pharmaceutical Education Through Virtual 3D Printing Laboratories.* (ETRD-D-23-01332 under review at Educational Technology Research & Development)

Published Peer Reviewed Publications

- 2024 **Sinko, PD**, Salehi, N., Halseth, T., Meyer, PJ, Amidon, GL, Ziff, RM, Amidon, GE. *Particle size, dose, and confinement affect passive diffusion flux through the membrane concentration boundary layer.* Mol. Pharmaceutics 2024, 21, 1, 201–215. <https://doi.org/10.1021/acs.molpharmaceut.3c00761>.
- 2024 **Sinko PD**, Parker L, Prahl Wittberg L., Bergström CAS. *Estimation of the concentration boundary layer adjacent to a flat surface using computational fluid dynamics.* International Journal of Pharmaceutics. 2024, 653:123870. doi: 10.1016/j.ijpharm.2024.123870
- 2023 Naranjani B, **Sinko PD**, Bergström CAS, Gogoll A, Hossain S, Larsson P. *Numerical simulation of peristalsis to study co-localization and intestinal distribution of a macromolecular drug and permeation enhancer.* International Journal of Biological Macromolecules. 2023. 240:124388. doi: 10.1016/j.ijbiomac.2023.124388.
- 2023 Jacobsen, AC., Kabedev, A., **Sinko, PD**, Palm, JE, Bergström, CAS, Teleki, A. *Intrinsic lipolysis rate for systematic design of lipid-based formulations.* Drug Deliv. and Transl. Res. 13, 1288–1304 (2023). <https://doi.org/10.1007/s13346-022-01246-y>.
- 2020 Mol Pharm: **Sinko, PD**, Sarah Harris, Niloufar Salehi, Pamela J Meyer, Gordon L Amidon, Gregory E Amidon. *Ultrathin, Large-Area Membrane Diffusion Cell for pH-Dependent Simultaneous Dissolution and Absorption Studies.* Molecular Pharmaceutics, 2020, 17, 7, 2319–2328. <https://doi.org/10.1021/acs.molpharmaceut.0c00040>.
- 2018 Int J Pharm: Hens, B., **Sinko, PD**, Job, N, Dean, M, Al-Gousous, J, Salehi, N, Ziff, RM, Tsume, Y, Bermejo, M, Paixão, P, Brasseur, JG, Yu, A, Talattof, A, Benninghoff, G, Langguth,

- P, Lennernäs, H, Hasler, WL, Marciani, L, Dickens, J, Shedden, K, Sun, D, Amidon, GE, Amidon, GL. Formulation predictive dissolution (fPD) testing to advance oral drug product development: An introduction to the US FDA funded '21st Century BA/BE' project. International Journal of Pharmaceutics 548, 1, 5 2018, Pages 120-127.
<https://doi.org/10.1016/j.ijpharm.2018.06.050>.
- 2017 Nat Comm: Olga Shalev, Shreya Raghavan, J. Maxwell Mazzara, Nancy Senabulya, **Patrick D. Sinko**, Elyse Fleck, Christopher Rockwell, Nicholas Simopoulos, Christina M. Jones, Anna Schwendeman, Geeta Mehta, Roy Clarke, Gregory E. Amidon & Max Shtein. Printing of small molecular medicines from the vapor phase. Nature Communications 8, 711 (2017).
<https://doi.org/10.1038/s41467-017-00763-6>
- 2017 Mol Pharm: Sinko, **PD**, **Gidley**, D, Vallery, R, Lamoureux, A, Amidon, GL, Amidon, GE. In Vitro Characterization of the Biomimetic Properties of Poly(dimethylsiloxane) To Simulate Oral Drug Absorption Molecular Pharmaceutics 2017 14 (12), 4661-4674 DOI: 10.1021/acs.molpharmaceut.7b00798.
- 2014 J ElectroChem Soc: John Cannarella, Xinyi Liu, Collen Z. Leng, **Patrick D. Sinko**, Gennady Y. Gor and Craig B. Arnold Mechanical Properties of a Battery Separator under Compression and Tension. J. Electrochem. Soc. 161 F3117. DOI 10.1149/2.0191411jes
- 2013 Pharm Dev and Tech: Pandey P., **Sinko PD**, Dilbir S. Bindra, Rhye Hamey, Shruti Gour, Chandra Vema-Varapu, Processing challenges with solid dosage formulations containing Vitamin E TPGS, Pharmaceutical Development and Technology February 2013, Vol. 18, No. 1, February 2013: 296-304.

Summary of bibliometric information, including the source of this information (note that Chalmers uses Scopus)

Number of Citations: 338 (scopus)

h-index: 6 (scopus)

Documents: 10 (scopus)