

# Daniel Bojar, PhD

## Curriculum Vitae

### Employment

- 01/2021 - present - **Tenure-track Assistant Professor** (Associate Senior Lecturer) at the Department of Chemistry and Molecular Biology & the Wallenberg Centre for Molecular and Translational Medicine of the **University of Gothenburg**.
- 09/2019 - 12/2020 - **Postdoctoral Researcher** in the research group of Dr. James J. Collins at **MIT** and the Wyss Institute for Biologically Inspired Engineering of **Harvard University**.
- 05/2016 - 07/2019 - **PhD in Mammalian Synthetic Biology** (defended February 14<sup>th</sup>, graduated June 3<sup>rd</sup>) in the research group of Dr. Martin Fussenegger at the D-BSSE of **ETH Zurich**.
- 09/2012 - 03/2016 - **Research assistant** at **ETH Zurich** (Dr. M. Fussenegger), **University of Zurich** (Dr. M. Jinek, Dr. A. Plueckthun), and the **Max Planck Society** (Dr. M. Hothorn).

### Education

- 09/2014 - 03/2016 - **Master of Science ETH** in 'Structural Biology and Biophysics' at ETH Zurich, final grade: 5.78 / 6.0 [Swiss Grades]. Graduated with Distinction.
- 10/2011 - 07/2014 - **Bachelor of Science** 'Biochemistry' at Eberhard-Karls-University Tuebingen, final grade: 1.1 / 1.0 [German Grades]. Awarded for graduating at the top of the program.

### Selected Publications (ORCID: 0000-0002-3008-7851; [Full List](#))

- 01/2023 - Chunsheng, J., Lundstrøm, J., Korhonen, E., Luis, A.S., and **Bojar, D.\*** Breast Milk Oligosaccharides Contain Immunomodulatory Glucuronic Acid and LacdiNAc. *bioRxiv*, doi:[10.1101/2023.01.16.524336](https://doi.org/10.1101/2023.01.16.524336).
- 11/2022 - Joeres, R., **Bojar, D.**, and Kalinina, O.V. GlyLES: Grammar-based Parsing of Glycans from IUPAC-condensed to SMILES. *bioRxiv*, doi:[10.1101/2022.11.10.515921](https://doi.org/10.1101/2022.11.10.515921).
- 09/2022 - Qin, R., Mahal, L.K., and **Bojar, D.\*** Deep Learning Explains the Biology of Branched Glycans from Single-Cell Sequencing Data. *iScience*, 25:[105163](https://doi.org/10.1016/j.isci.2022.105163).
- 08/2022 - **Bojar, D.\*** and Lisacek, F\*. Glycoinformatics in the AI era. *Chem Rev*, 122:[15971-15988](https://doi.org/10.1021/acs.chemrev.1c00888).
- 02/2022 - Lundstrøm, J. and **Bojar, D.\*** Structural Insights into Host-Microbe Glycointeractions. *Curr Opin Struct Biol*, 73:[102337](https://doi.org/10.1016/j.csi.2021.102337).
- 01/2022 - **Bojar, D.**, Meche, L., Meng, G., Eng, W., Smith, D.F., Cummings, R.D., Mahal, L.K. A Useful Guide to Lectin Binding: Machine-Learning Directed Annotation of 57 Unique Lectin Specificities. *ACS Chem Biol*, 17:[2993-3012](https://doi.org/10.1021/acscchembio.1c00312).
- 12/2021 - Lundstrøm, J., Korhonen, E., Lisacek, F., and **Bojar, D.\*** LectinOracle – A Generalizable Deep Learning Model for Lectin-Glycan Binding Prediction. *Adv Sci*, 9:[2103807](https://doi.org/10.1002/advs.2103807).
- 09/2021 - Thomès, L., and **Bojar, D.\*** The role of fucose-containing glycan motifs across taxonomic kingdoms. *Front Mol Biosci*, 8:[755577](https://doi.org/10.3389/fmolb.2021.755577).
- 07/2021 - **Bojar, D.\*** Construction of caffeine-inducible gene switches in mammalian cells. *Meth Mol Biol*, 2312:[159-168](https://doi.org/10.1007/978-1-0716-0159-1_159).
- 06/2021 - Thomès, L., Burkholz, R., and **Bojar, D.\*** Glycowork: A Python package for glycan data science and machine learning. *Glycobiology*, 31:[1240-1244](https://doi.org/10.1093/glycob/cwaa124).
- 06/2021 - Burkholz, R., Quackenbush, J., and **Bojar, D.\*** Using Graph Convolutional Neural Networks to Learn a Representation for Glycans. *Cell Rep*, 35:[109251](https://doi.org/10.1016/j.celrep.2021.109251).

- 02/2021 Strittmatter, T., Egli, S., Bertschi, A., Plieninger, R., **Bojar, D.**, Xie, M., and Fussenegger, M. Gene switch for L-glucose-induced biopharmaceutical production in mammalian cells. *Biotechnol Bioeng*, 118:2220-2233.
- 01/2021 Uhlich, M. and **Bojar, D.**\* DeepConnection: Classifying Relationship State from Images of Romantic Couples. *J Comput Soc Sci*, 4:631-653.
- 01/2021 **Bojar, D.**, Powers, R.K., Camacho, D.M., and Collins J.J. Deep-Learning Resources for Studying Glycan-Mediated Host-Microbe Interactions. *Cell Host Microbe*, 29:132-144.
- 04/2020 **Bojar, D.**, Powers, R.K., Camacho, D.M., and Collins J.J. SweetOrigins: Extracting Evolutionary Information from Glycans. *bioRxiv*, doi:10.1101/2020.04.08.031948.
- 01/2020 **Bojar, D.**, Camacho, D.M., and Collins J.J. Using Natural Language Processing to Learn the Grammar of Glycans. *bioRxiv*, doi:10.1101/2020.01.10.902114v1.
- 11/2019 Saxena, P., **Bojar, D.**, Zulewski, H., and Fussenegger, M. Synthetic Biology Technologies for Beta Cell Generation. *Transplantation, Bioengineering, and Regeneration of the Endocrine Pancreas*, ISBN:9780128148310.
- 10/2019 **Bojar, D.** and Fussenegger, M. The Role of Protein Engineering in Biomedical Applications of Mammalian Synthetic Biology. *Small*, 16:1903093.
- 04/2019 Kim, H.<sup>+</sup>, **Bojar, D.**<sup>+</sup>, and Fussenegger, M. A CRISPR/Cas9-based central processing unit to program complex logic computation in human cells. *Proc Natl Acad Sci USA*, 9:7214-7219. Co-first authorship.
- 03/2019 **Bojar, D.**, Fuhrer, T., and Fussenegger, M. Purity by design: Reducing impurities in bioproduction by stimulus-controlled global translational downregulation of non-product proteins. *Metab Eng*, 52:110-123.
- 07/2018 **Bojar, D.** and Fussenegger, M. Programming mammalian gene expression with the antibiotic simocyclinone D8 and the flavonoid luteolin. *AIChE J*, 64:4237-4246.
- 06/2018 **Bojar, D.**, Scheller, L., Charpin-El Hamri, G., Xie, M., and Fussenegger, M. Caffeine-inducible gene switches controlling experimental diabetes. *Nat Commun*, 9:2318.
- 04/2018 Scheller, L., Strittmatter, T., Fuchs, D., **Bojar, D.**, and Fussenegger, M. Generalized extracellular molecule sensor (GEMS) platform for programming cellular behavior. *Nat Chem Biol*, 14:723-729.
- 04/2018 Kojima, R.<sup>+</sup>, **Bojar, D.**<sup>+</sup>, Rizzi, G., Charpin-El Hamri, G., El Baba, M., Saxena, P., Auslaender, S., Tan, K.R., and Fussenegger, M. Designer exosomes produced by implanted cells intracerebrally deliver therapeutic cargo for Parkinson's disease treatment. *Nat Commun*, 9:1305. Co-first authorship.
- 11/2017 Hansen, S., Stueber, J., Ernst, P., Koch, A., **Bojar, D.**, Batyuk, A., and Plueckthun, A. Design and applications of a clamp for green fluorescent protein with picomolar affinity. *Sci Rep*, 7:16292.
- 10/2017 Saxena, P., **Bojar, D.**, Zulewski, H., and Fussenegger, M. Generation of glucose-sensitive insulin-secreting beta-like cells from human embryonic stem cells by incorporating a synthetic lineage-control network. *J Biotechnol*, 259:39-45.
- 08/2017 Saxena, P., **Bojar, D.**, and Fussenegger, M. Design of synthetic promoters for gene circuits in mammalian cells. *Meth Mol Biol*, 1651:263-273.
- 06/2016 **Bojar, D.** and Fussenegger, M. The best of both worlds: Reaping the benefits from mammalian and bacterial therapeutic circuits. *Curr Opin Chem Biol*, 34:11-19.
- 01/2014 **Bojar, D.**, Martinez, J., Santiago, J., Rybin, V., Bayliss, R., and Hothorn, M. Crystal structures of the phosphorylated BRI1 kinase domain and implications for brassinosteroid signal initiation. *Plant J*, 78:31-43.

## Patents and licenses

01/2020 Fussenegger, M., Scheller, L., Strittmatter, T., Fuchs D. and **Bojar, D.** Generalized Extracellular Molecule Sensor System. U.S. Application No. 16/737,076, filed January 8<sup>th</sup>, 2020

## External Funding & Awards

01/2023 - VR Establishment Grant. Funding of **4,000,000 SEK** [**\$380,000**] from the Swedish  
12/2026 Research Council.

12/2022 Nomination as **SciLifeLab Group Leader** at the SciLifeLab Gothenburg node.

05/2022 **Forbes 30 Under 30 Europe** in the category of 'Science and Healthcare'.

12/2021 **Rising Stars** series of *Advanced Science* for especially promising early-career researchers.

12/2021 - VR Project Grant. Funding of **3,600,000 SEK** [**\$350,000**] from the Swedish Research  
11/2024 Council. Co-Applicant (Main applicant: Sara Lindén).

08/2021 - Research Leader Initiative (REAL) of the University of Gothenburg (top 20% of new group  
06/2022 leaders).

06/2021 - NMMP Scientific Network Facilitation Grant. Funding of **69,500 SEK** [**\$6,500**] over one  
06/2022 year.

01/2021 - Start-up package as Wallenberg Molecular Medicine Fellow at the University of Gothenburg.  
12/2024 Approximately **10,200,000 SEK** [**\$952,000**] over four years.

06/2020 - Branco Weiss Fellowship – Society in Science. Funding of **500,000 CHF** [**\$521,000**] over  
present five years; success rate: 1.4%

04/2020 - Foresight Fellow in Health & Longevity. Foresight Institute, CA, USA.  
04/2021

06/2018 Selected Young Scientist at the 68<sup>th</sup> Lindau Nobel Laureate Meeting (600 most promising  
young physiology / medicine scientists worldwide)

11/2017 One of six finalists for the Lopez-Loreta Prize 2018 (funding of 1,000,000 €)

12/2016 ETH silver medal for outstanding Master's thesis by ETH Zurich

09/2014 - Fellow of the „Excellence Scholarship and Opportunity Program“ of ETH Zurich (most  
02/2016 talented 2-3% of their year)

07/2014 Award for outstanding academic achievements in the Bachelor of Science – Biochemistry  
by the Eberhard-Karls-University Tuebingen (best student of their year)

04/2013 - Fellow of the German Academic Scholarship Foundation (best 10% of their year)  
03/2016

03/2013 Deutschlandstipendium. Granted for one year. Gratefully declined.

05/2011 - Fellow of e-fellows (best 10% of their year)  
10/2016

## Conference Activity

08/2023 An interface is worth a thousand pictures: An integrated systems approach to glycobiology.  
26<sup>th</sup> International Symposium on Glycoconjugates, Taipei, Taiwan. **Invited Keynote  
Speaker.**

07/2023 glAicobiology. The 21<sup>st</sup> European Carbohydrate Symposium (Eurocarb) in Paris, France.  
**Invited Speaker.**

06/2023 Full-Stack Glycoinformatics: From Data to Insight. Beilstein Glyco-Bioinformatics Sympo-  
sium, Limburg, Germany. **Invited Speaker.**

06/2023 TBD. 26<sup>th</sup> Swedish Conference on Macromolecular Structure and Function, Gothenburg,  
Sweden. **Invited Speaker.**

- 10/2022 It Begins in Delight and Ends in Wisdom: Milk & Mass Spectrometry. Opening symposium of the Glycomics Institute of Alberta, Canada. **Invited Speaker.**
- 10/2022 The Cup of Life is Not so Shallow - Milky Secrets. Annual Meeting of the Society of Glycobiology, Amelia Island, FL, USA. **Invited Keynote Speaker.**
- 07/2022 Mucin Glycans & Machine Learning in Infection & Inflammation. Mucins in Health & Disease, Utrecht, The Netherlands. **Invited Speaker.**
- 11/2021 Glycobiology & Machine Learning: There is Grandeur in This View of Life. Frontiers in Congenital Disorders of Glycosylation Symposium, San Diego, CA, USA. **Invited Speaker.**
- 11/2021 Endless Forms Most Beautiful – Merging Machine Learning and Glycobiology. Annual Meeting of the Society of Glycobiology, San Diego, CA, USA. **Invited Keynote Speaker.**
- 11/2021 Learning the language of pathogen-glycan cross-talk. The Branco Weiss Symposium, Zurich, Switzerland. **Invited Speaker.**
- 07/2021 Of Language Models and Graphs - How Machine Learning can Advance Glycobiology. The 21<sup>st</sup> European Carbohydrate Symposium (Eurocarb) in Paris, France. Selected talk. Conference cancelled due to SARS-CoV-2.
- 06/2021 Bringing Glycobioinformatics to the Masses with the Python Package Glycowork. 3<sup>rd</sup> Australasian Glycoscience Symposium. Selected talk.
- 06/2020 Sequence-to-Function Models for Glycobiology Using Machine Learning (Poster). 12<sup>th</sup> International Symposium on Glycosyltransferases, Boston, MA, USA.
- 06/2020 Using Glycan-Focused Machine Learning for Functional Glycomics. 4<sup>th</sup> annual New England Glyco-Chemistry Meeting, Boston, MA, USA.
- 09/2018 Treating Diabetes with a Cup of Coffee. 3<sup>rd</sup> Bioengineering & Translational Medicine Conference, Boston, MA, USA.
- 09/2018 Treating Diabetes with a Cup of Coffee. Cell Therapies and Bioengineering Conference, UCSF, San Francisco, CA, USA.
- 11/2017 Synthetic Biology-inspired Differentiation of Human Embryonic Stem Cells into Beta-like Cells. EuroTech Winter School, Eindhoven University of Technology, Eindhoven, Netherlands.
- 05/2014 Mechanistic insights into brassinosteroid signalling initiation (Poster). Interdisciplinary Plant Group Symposium "Plant Protein Phosphorylation", Columbia, MO, USA.

## Selected Invited Campus Talks

- 12/2022 Mapping data to sequence to function - The promise of glycobioinformatics. European Glycoscience Community webinar. December 1<sup>st</sup>.
- 10/2022 Glycan-Mediated Pathogenesis: A Candy a Day Keeps the Doctor Away. Institute of Pharmaceutical Sciences, ETH Zurich. October 19<sup>th</sup>.
- 09/2022 Sugars in the Cloud: Machine Learning and Data Science for Glycobiology. APBioNET, September 21<sup>st</sup>.
- 03/2022 Sweet Computations: Glycans in Health. Computational Health Seminar, Institute of Computational Biology, Helmholtz Zentrum Munich. March 28<sup>th</sup>.
- 03/2022 Glycans in Health: The Role of Machine Learning. Yearly event of the Wallenberg Centre for Molecular and Translational Medicine, March 10<sup>th</sup>.
- 12/2021 Glycans & Graphs: Understanding the most complex biological sequence with machine learning. Saarland University, December 14<sup>th</sup>.
- 05/2021 Sugar, Sugar – Unraveling the Roles of Glycans in Biology via Machine Learning. Gothenburg Bioinformatics Network (GOTBIN), May 25<sup>th</sup>.

- 05/2020 SweetOrigins: Extracting Evolutionary Information from Glycans. Department of Biostatistics, Harvard University, May 18<sup>th</sup>.
- 03/2020 Sequence-to-Function Models for Glycobiology Using Machine Learning. Harvard School of Public Health, March 6<sup>th</sup>.
- 02/2020 SweetTalk: A Machine Learning-Based Language Model for Glycans. ETH Zurich, Feb. 11<sup>th</sup>.

## Teaching

- 04/2023 - present Phylogeny lectures in the Evolutionary Genomics course (BIO442) at the University of Gothenburg.
- 01/2023 - present Molecular neurobiology lectures in the Neurobiology course (BIO501) at the University of Gothenburg.
- 12/2021 - present AI in drug development lecture in the Drug Development course (BIO524) at the University of Gothenburg.
- 02/2021 - present Course leader for the Bioinformatics and Functional Genomics course (BIO210) at the University of Gothenburg.
- 09/2021 - 2022 Glycomics/Glycoproteomics lectures in the Advanced Functional Genomics course (BIO406) at the University of Gothenburg.
- 03/2021 - 2022 CRISPR/Cas9 knockout screen lecture and seminar in the Experimental Systems Biology course (BIO448) at the University of Gothenburg.
- 06/2016 - 06/2019 Cellular Engineering Mammalian Cells course at ETH Zurich.

## Mentoring

- 2023 - present Supervising Master's thesis of Christina Grozou at University of Gothenburg.
- 2022 - present Supervising PhD studies of James Urban at University of Gothenburg.
- 2021 - present Supervising PhD studies of Jon Lundstrøm at University of Gothenburg.
- 2021 - 2022 Supervised Master's thesis of Viktoria Karlsson at University of Gothenburg.
- 2021 - 2022 Supervised Master's thesis of Emma Korhonen at University of Gothenburg.
- 2017 - 2018 Supervised Master's thesis of Jonas Fernbach at ETH Zurich.
- 2017 Supervised Amgen Scholarship of Aonia Traxler at ETH Zurich.

## Community Service

- 2021 - present Chair of the Glycoinformatics Consortium (GLIC).
- 2021 - present Steering committee of the Gothenburg Bioinformatics Network (GOTBIN).
- 2021 - 2022 Organizing the Molecular and Cellular Biology division seminar series for the Department of Chemistry and Molecular Biology at the University of Gothenburg.
- 2019 News & Views articles for OUP *Synthetic Biology*: [1](#), [2](#), [3](#), [4](#), [5](#)

Reviewer for *Nature Machine Intelligence*, *Biotechnology and Bioengineering*, *Chem*, *IEEE Open Journal of Engineering in Medicine and Biology*, *ACS Synthetic Biology*, *Current Opinion in Chemical Biology*, *Chemical Science*, *PLoS One*, *OUP Synthetic Biology*, *Comp Biochem Physiol B Biochem Mol Biol*, *Critical Reviews in Biotechnology*, and *Glycobiology*.

## Outreach & Communication

Writing in-depth and compelling science communication articles for [Times Higher Education](#), [Towards Data Science](#), [Nautilus Magazine](#), [Medium](#), [Massive Science](#), [ASBMB](#), [PLOS Synbio](#), [Tales of the Cocktail](#), [Spektrum der Wissenschaft](#), [GenoFAB](#), etc.

Reviewing popular science books for the [Royal Society of Biology](#).

Communicating science to diverse audiences through invited public talks (750+ attendees) and selected talks at several international scientific conferences (100+ attendees).

- 01/2018 - Communications Officer on the [EUSynBioS](#) (European association of synthetic biology)
- 04/2019 - Steering Committee; organized an international conference in Toulouse (100+ attendees).

Further Information: [LinkedIn](#), [GitHub](#), [Google Scholar](#)