

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 14th, graduated June 3rd) 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](#))

- 02/2022 - Lundstrøm, J. and **Bojar, D.** Structural Insights into Host-Microbe Glycointeractions. *Curr Opin Struct Biol*, doi:[10.1016/j.sbi.2022.102337](https://doi.org/10.1016/j.sbi.2022.102337).
- 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*, doi:[10.1021/acscchembio.1c00689](https://doi.org/10.1021/acscchembio.1c00689).
- 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/ciaa124).
- 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](https://doi.org/10.1002/bit.22220).
- 01/2021 - Uhlich, M. and **Bojar, D.** DeepConnection: Classifying Relationship State from Images of Romantic Couples. *J Comput Soc Sci*, 4:[631-653](https://doi.org/10.1002/jcs2.631).
- 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](https://doi.org/10.1016/j.chom.2021.132-144).
- 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](https://doi.org/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](https://doi.org/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](https://doi.org/10.1007/978-0-13-012814-8).
- 10/2019 **Bojar, D.** and Fussenegger, M. The Role of Protein Engineering in Biomedical Applications of Mammalian Synthetic Biology. *Small*, 16:[1903093](https://doi.org/10.1002/smll.201903093).
- 04/2019 Kim, H. *, **Bojar, D.** *, 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](https://doi.org/10.1073/pnas.190721496). 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](https://doi.org/10.1016/j.ymben.2018.11.010).
- 12/2018 **Bojar, D.** Updating the in silico human surfaceome with meta-ensemble learning and feature engineering. *bioRxiv*, doi:[10.1101/499780](https://doi.org/10.1101/499780).
- 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](https://doi.org/10.1002/aic.14466).
- 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](https://doi.org/10.1038/s41467-018-0331-8).
- 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](https://doi.org/10.1038/s41589-018-0178-8).
- 04/2018 Kojima, R. *, **Bojar, D.** *, 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](https://doi.org/10.1038/s41467-018-0331-8). 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](https://doi.org/10.1038/s41598-017-16292-2).
- 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](https://doi.org/10.1016/j.jbiotec.2017.09.010).
- 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](https://doi.org/10.1007/978-1-4939-9831-8_15).
- 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](https://doi.org/10.1016/j.cob.2016.05.002).
- 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](https://doi.org/10.1111/1365-3113.12288).

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 8th, 2020

External Funding & Awards

- 12/2021 **Rising Stars** series of *Advanced Science* for especially promising early-career researchers.
- 08/2021 - Research Leader Initiative (REAL) of the University of Gothenburg (top 20% of new group leaders).
- 06/2022

- 06/2021 - NMMP Scientific Network Facilitation Grant. Funding of **69,500 SEK** [**\$8,000**] over one year.
- 06/2022
- 06/2020 - Branco Weiss Fellowship – Society in Science. Funding of **500,000 CHF** [**\$543,000**] 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 68th 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 talented 2-3% of their year)
- 02/2016
- 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

- 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 21st 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. 3rd Australasian Glycoscience Symposium. Selected talk.
- 06/2020 Sequence-to-Function Models for Glycobiology Using Machine Learning (Poster). 12th International Symposium on Glycosyltransferases, Boston, MA, USA.
- 06/2020 Using Glycan-Focused Machine Learning for Functional Glycomics. 4th annual New England Glyco-Chemistry Meeting, Boston, MA, USA.
- 09/2018 Treating Diabetes with a Cup of Coffee. 3rd 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 Talks

- 03/2022 Sweet Computations: Glycans in Health. Computational Health Seminar, Institute of Computational Biology, Helmholtz Zentrum Munich. March 28th.
- 03/2022 Glycans in Health: The Role of Machine Learning. Yearly event of the Wallenberg Centre for Molecular and Translational Medicine, March 10th.
- 12/2021 Glycans & Graphs: Understanding the most complex biological sequence with machine learning. Saarland University, December 14th.
- 05/2021 Sugar, Sugar – Unraveling the Roles of Glycans in Biology via Machine Learning. Gothenburg Bioinformatics Network (GOTBIN), May 25th.
- 05/2020 SweetOrigins: Extracting Evolutionary Information from Glycans. Department of Biostatistics, Harvard University, May 18th.
- 03/2020 Sequence-to-Function Models for Glycobiology Using Machine Learning. Harvard School of Public Health, March 6th.
- 02/2020 SweetTalk: A Machine Learning-Based Language Model for Glycans. ETH Zurich, Feb. 11th.

Teaching

- 12/2021 - present AI in drug development lecture in the Drug Development course (BIO524) at the University of Gothenburg.
- 09/2021 - present Glycomics/Glycoproteomics lectures in the Advanced Functional Genomics course (BIO406) at the University of Gothenburg.
- 03/2021 - present CRISPR/Cas9 knockout screen lecture and seminar in the Experimental Systems Biology course (BIO448) at the University of Gothenburg.
- 02/2021 - present Glycobioinformatics lecture in the Bioinformatics and Functional Genomics course (BIO210) at the University of Gothenburg.
- 06/2016 - Cellular Engineering Mammalian Cells course at ETH Zurich.
- 06/2019

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*, *Chemical Science*, *PLoS One*, *OUP Synthetic Biology*, *Comp Biochem Physiol B Biochem Mol Biol*, and *Critical Reviews in Biotechnology*.

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](#)