+1 416 827 0137
jonas@jonas-wessen.com
Toronto, Canada
jonas-wessen.com
linkedin.com/in/jonas-wessen
github.com/jwessen

SKILLS

Mathematics & Physics

- Statistical mechanics
- Protein design
- Phase transitions
- Polymer theory
- Quantum mechanics & field theory

Computational Physics

- Monte Carlo Simulations
- Molecular Dynamics Simulations
- Continuum Field-Theoretic Simulations

Programming

- Python (Expert)
- C++ (Experienced)
- Numpy / SciPy / Pandas
- Keras / PyTorch / TensorFlow
- High performance computation
- GPU programming
- Neural network machine learning
- Object-oriented programming
- Data structures & algorithms

Soft skills

- Interdisciplinary research
- Project coordination
- Science communication
- Analytic mindset

Languages

- Swedish (Native)
- English (Native)
- French (Intermediate)

Jonas Wessén, Ph.D.

Theoretical physicist

SUMMARY STATEMENT

With **over 9 years of research experience** in computational biophysics and theoretical physics, resulting in **19 scientific publications**, I have a proven track record in project design and creative data-driven problem-solving using computation. I have a passion for applying deep physical ideas in new domains, and I am always eager to learn new concepts and contribute to cutting-edge research.

KEY COMPETENCES

✦ Computational Physics/Chemistry ✦ Protein Biophysics ✦ Polymer Theory
✦ High-Performance Computation ✦ Python Programming ✦ Machine Learning
✦ Molecular Dynamics Simulations ✦ Statistical Mechanics ✦ Bayesian Inference

EXPERIENCE

Postdoctoral Research Fellow / Sep 2018 - Present

University of Toronto / Dept. of Biochemistry / Canada

- Performed theoretical biophysical research on the molecular origin of biomolecular condensates (“membrane-less organelles”).
- Developed software and mathematical methods for phase-separation of intrinsically disordered proteins and RNA with potential applications in polymeric materials science and drug discovery.
- Published 6 journal articles and one book chapter accompanied by open-source software. Results presented in posters and talks at 9 conferences.
- Received training at SciNet in neural network-based machine learning.
- Initiated and coordinated interdisciplinary research projects with biologists, chemists and physicists based in Canada, USA, Sweden, China and India.

Doctoral student / Jul 2014 - Sep 2018

Lund University / Dept. of Astronomy and Theoretical Physics / Sweden

- Researched supersymmetric and grand-unified theories as underlying explanations of the structure of the Standard Model.
- Training in scientific communication through conferences and publications.
- Visiting researcher for one week at Aveiro University, Portugal, in 2016.
- Supervised projects, led exercise sessions and lectured in courses on *Statistical Mechanics, Quantum Field Theory, Multivariable Analysis, Python Programming, Java Programming, General Physics*.

Undergraduate studies / Sep 2009 - Jun 2012

Lund University / Dept. of Astronomy and Theoretical Physics / Sweden

- Master’s thesis on statistical mechanics of amyloid fibrils with results published in the Journal of Chemical Physics.
- Bachelor’s thesis on astro-particle physics, work performed as an exchange student at Universidad Complutense de Madrid, Spain.
- Received the highest possible grade in 96% of all course credits obtained.
- Part-time physics/mathematics teacher (ages 6-9 and 15-18).

BIBLIOMETRIC INFORMATION

Google Scholar:
Citations: 271
h-index: 11

PUBLICATIONS SUMMARY

My 19 publications can be categorised as follows:

- 2 preprints (submitted to journals)
- 11 peer-reviewed journal articles
- 1 book chapter
- 2 conference proceedings
- 3 theses

A complete list of publications can be found at jonas-wessen.com/publications

CONFERENCE PARTICIPATION

Attended 13 conferences and 5 schools during which I

- gave 4 talks
- presented 7 posters
- chaired 1 session

ACADEMIC DEGREES

Doctor of Philosophy (Theoretical Physics), *2018, Lund University*
Thesis title: Family symmetries and radiative corrections in multi-scalar extensions of the Standard Model
Advisor: Prof. Roman Pasechnik

Master of Science (Theoretical Physics), *2014, Lund University*
Thesis title: Amyloid nucleation in presence of crowders
Advisor: Prof. Anders Irbäck

Bachelor of Science (Theoretical Physics), *2012, Lund University*
Thesis title: Dark matter signatures in cosmic gamma-rays
Advisors: Profs. Leif Lönnblad, José Alberto Ruiz Cembranos*, Konstancja Satalecka*
(*Universidad Complutense de Madrid)

COMMISSIONS OF TRUST

- Reviewed multiple manuscripts for the Journal of Chemical Physics.
- Co-chaired the *Liquid-Liquid Phase Separation and Protein Interactions* session at the 2023 *Gordon Research Seminar: Proteins* in Holderness, New Hampshire, USA.

While a PhD student at Lund University, I undertook the following duties:

- Member of the Department Board, advocating for the interests of theoretical physics bachelors', masters', and PhD students.
- Student representative on committees for hiring two PhD students (2016), one postdoc (2015) and nomination of head of department (2016).

PUBLICATION HIGHLIGHTS

- **J. Wessén**, S. Das, T. Pal, H. S. Chan. Analytical formulation and field-theoretic simulation of sequence-specific phase separation of proteinlike heteropolymers with short- and long-spatial-range interactions, *J. Phys. Chem.* **B** 2022, 126, 45, 9222–9245
  DOI: 10.1021/acs.jpcb.2c06181, Preprint: arXiv:2209.04016
- Y.-H. Lin*, **J. Wessén***, T. Pal*, S. Das, H. S. Chan. Numerical Techniques for Applications of Analytical Theories to Sequence-Dependent Phase Separations of Intrinsically Disordered Proteins. In: Zhou, HX., Spille, JH., Banerjee, P.R. (eds) Phase-Separated Biomolecular Condensates (2023). Methods in Molecular Biology, vol 2563. Humana, New York, NY. (*equal contribution)
  DOI: 10.1007/978-1-0716-2663-4_3, Preprint: arXiv:2201.01920.
- A. Irbäck, **J. Wessén**. Thermodynamics of amyloid formation and the role of intersheet interactions, *J. Chem. Phys.* **143**, 105104 (2015)
  DOI: 10.1063/1.4930280, Preprint: arXiv:1601.00478

OTHER INFORMATION

- **Music:** Experienced performer as a jazz piano player. Played the harmonium on the full-length album *From Beyond* (2017) by Delve.
- **Chess:** Peak Elo ratings of 1819 (lichess.org) and 1640 (chess.com).
- **Rock climbing:** Top grades of V5 / 6C+ (bouldering) and 5.11b (rope climbing).

REFERENCES

References are available upon request.