Shan Shan Curriculum Vitae

Associate Professor, Mathematics and Computer Science, University of Southern Denmark

SCIENTIFIC FOCUS AREAS

- Quantum computing and its applications, especially in the continuous variable formalism
- Geometric and statistical methodology for shape analysis
- Mathematical framework for machine learning and high-dimensional data analysis

PROFESSIONAL APPOINTMENTS

2024 –	Associate Professor. Department of Mathematics and Computer Science.
2022 – 2024	Assistant Professor. Department of Mathematics and Computer Science.
2021 – 2022	Postdoctoral Research Fellow. Department of Mathematics and Computer Science.
2021 –	Affiliated member of the Centre of Quantum Mathematics.
	University of Southern Denmark.
2020 – 2021	Tenure-track Assistant Professor. Department of Mathematics and Statistics.
	Mount Holyoke College.
2019 – 2020	Postdoctoral Research Fellow. Department of Mathematics.
	Duke University.

EDUCATION

Ph.D.   Duke University, Mathematics, 2014-2019
Title: "Probabilistic models on fiber bundles".
Advisor: Ingrid Daubechies, Ph.D.

B.A.   Agnes Scott College, Mathematics summa cum laude, 2010-2014

GRANTS RECEIVED

Active: Affiliated researcher. (Lead PI Jørgen Ellegaard Andersen.) "Topological Photonic Quantum Computing and its Applications." Danmarks Innovationsfond: 23.74 million kr. 2024-2029.

Active: coPI. (Lead PI Maja Thiele) "Quantum Mathematics for Quality Decisions in the Liver Clinic." Region Syddanmarks Innovationspulje: 2 million kr. 2023-2025.

Completed: coPI. (Lead PI Jørgen Ellegaard Andersen) "Quantum Computing in Clinical Research." Danish Institute of Advanced Study: 0.3 million kr. 2022.

PUBLICATIONS

(authors are listed first-to-last, *authors are listed alphabetically)

Preprints
*Jørgen Ellegaard Andersen, Shan Shan. 2025. Use Gaussian Boson Samplers to approximate Gaussian expectation problems. arXiv preprint. arXiv:2502.19336.

*Jørgen Ellegaard Andersen, Shan Shan. 2025. Estimating the percentage of GBS advantage in Gaussian expectation problems. arXiv preprint. arXiv:2502.19362.

Felix Risbro Hjerrild, Shan Shan, Doug Boyer, Ingrid Daubechies. 2024. signDNE: A python package for ariaDNE and its sign-oriented extension. arXiv preprint. arXiv:2409.05549.

Peer-reviewed Articles

*Jørgen Ellegaard Andersen, Anne-Marie Mai, Jakob Blaabjerg Møller, Shan Shan. 2024. 'He Has the Whole Package: Lyrics, Melodies, Enigmatic, mythical': Images of Bob Dylan – Results of Questionnaire. Aktualitet - Litteratur, Kultur Og Medier, s. 1-33.

Maria Kjaergaard, Katrine Prier Lindvig, Katrine Holtz Thorhauge, Peter Andersen, Johanne Kragh Hansen, Nanna Kastrup, Jane Møller Jensen, Camilla Dalby Hansen, Stine Johansen, Mads Israelsen, Nikolaj Torp, Morten Beck Trelle, Shan Shan, Sönke Detlefsen, Steen Antonsen, Jørgen Ellegaard Andersen, Isabel Graupera, Pere Ginés, Maja Thiele, Aleksander Krag. 2023. Performance of Enhanced Liver Fibrosis test, FIB-4, and NAFLD fibrosis score in a screening study of 3,387 participants. Journal of Hepatology. 79, 2, 277-286.

Genesis Lara Granados, Juliet Greenwood, Stephen Secor, Shan Shan, Brandon Hedrick, Patricia Brennan. 2022. Examining the shape and size of female and male genitalia in snakes using three-dimensional geometric morphometrics. Biological Journal of the Linnean Society, 136.3, 466-476.

Sara Rolfe, Steve Pieper, Arthur Porto, Kelly Diamond, Julie Winchester, Shan Shan, Henry Kirveslahti, Doug Boyer, Adam Summers, Murat Maga. 2021. SlicerMorph: An open and extensible platform to retrieve, visualize and analyze 3D morphology. Methods in Ecology and Evolution. 12(10): 1816-1825.

Ethan Fulwood, Shan Shan, Julia Winchester, Henry Kirveslahti, Robert Ravier, Shahar Kovalsky, Ingrid Daubechies & Doug Boyer. 2021. Reconstructing dietary ecology of extinct strepsirrhines (Primates, Mammalia) with new approaches for characterizing and analyzing tooth shape. Paleobiology. 47(4):612-631.

Ethan Fulwood, Shan Shan, Julia Winchester, Henry Kirveslahti, Tingran Gao, Doug Boyer, Ingrid Daubechies. 2021. Insights from macroevolutionary modeling and ancestral state reconstruction into the radiation and historical dietary ecology of Lemuriformes (Primates, Mammalia). BMC Evolutionary Biology. 21, 60.

Shan Shan, Shahar Z. Kovalsky, Julie M. Winchester, Doug M. Boyer, Ingrid Daubechies. 2019. ariaDNE: A Robustly Implemented Algorithm for Dirichlet Energy of the Normal. Methods in Ecology and Evolution.

Book chapters

Shan Shan, Ingrid Daubechies. 2023. Diffusion Maps: Using the Semigroup Property for Parameter Tuning. Theoretical Physics, Wavelets, Analysis, Genomics. Springer, 409-424.

PRESENTATIONS

Seminars

2024 Research Center of Mathematics and Interdisciplinary Sciences of Shandong University.
2024 IMADA talk, University of Southern Denmark. Odense, Denmark.
2024 BigQ Seminar. Danmarks Tekniske Universitet. Lyngby, Denmark.
2023 Danish Meteorological Institute. Copenhagen, Denmark.
2019 Memorial Sloan Kettering Cancer Center. New York City, NY, USA.
2019 Math and statistics seminar, Mount Holyoke College. South Hadley, MA, USA.
2017 Math Slam Research Symposium at Duke University. Durham, NC, USA.

Conferences

2025 Workshop on Quantum Applications in Integrated Photonics. Ljubljana, Slovenia.
2024 Workshop on Quantum Key Distribution for Enterprises and Governments. Copenhagen, Denmark.
2024 Workshop in honor of Ingrid Daubechies at Duke University. Durham NC, USA.
2024 Scientific Quantum Conference. Odense, Denmark.
2024 Joint Mathematics Meetings, San Francisco CA, USA
2024 International Conference for Women in Mathematics. Copenhagen, Denmark.
2023 DIREC/SDU workshop on quantum computing. Odense, Denmark.
2023 International conference for Women Mathematicians in Sciences. Odense, Denmark.
2019 SIAM Conference on Dynamical Systems. Snowbird, UT, USA.
2019 Joint Mathematics Meetings. Denver, CO, USA.
2019 Data Science Consortium Conference. Michigan Institute for Data Science. Ann Arbor, MI, USA.
2018 Daubechies 64. Hasselt University and Park Molenheide, Belgium.
2015 Southeastern Conference for Undergraduate Women in Math. Durham, NC, USA.
2014 Spring Annual Research Conference. Agnes Scott College. Decatur, GA, USA.
2014 Nebraska Conference for Undergraduate Women in Math. Lincoln, NE, USA.
2013 Southeastern Conference for Undergraduate Women in Math. Clemson, SC, USA.
2013 BSM EUR Conference. Budapest Semesters in Mathematics. Budapest, Hungary.
2012 Spring Annual Research Conference. Agnes Scott College. Decatur, GA, USA.

Lecture series and tutorials

2022 Robotics Elite Summer School. Odense, Denmark.
2020 3D Morphometrics and Image Analysis Workshop. University of Washington. Friday Harbor WA, USA.
2019 3D Morphometrics and Image Analysis Workshop. University of Washington. Friday Harbor WA, USA.
2017 Summer Workshop in Mathematics (SWiM). Duke University. Durham NC, USA.

TEACHING

University of Southern Denmark
AI503 Calculus. Fall 2024, Fall 2025
MM571 First Year Project. Spring 2024, Spring 2025

Mount Holyoke College
Stat 140 Introduction to the Ideas and Applications of Statistics. Fall 2020

Duke University
Math 106L Laboratory Calculus and Functions II. Spring 2018
Math 122L Introductory Calculus II with Applications. Fall 2016
Math 105L Laboratory Calculus and Functions I. Fall 2015

SUPERVISION OF STUDENTS

Master students
2024   Tobias Fiskbæk Juul (Biochemistry and Molecular Biology), co-supervisors: Maria Timofeeva and
        Veit Schwämmle, University of Southern Denmark
2024   Asmus Tørsleff (Quantum information), co-supervisors: Ulrik Lund Andersen and Jørgen Ellegaard
        Andersen, University of Copenhagen and Danish Technical University
2023   Jakob Blaabjerb Møller (Data science), co-supervisor: Jørgen Ellegaard Andersen, University of
        Southern Denmark

Bachelor students
2024   Felix Risbro Hjerrild (Applied Mathematics), University of Southern Denmark
2024   Kristoffer Hagedorn Larsen (Applied Mathematics), University of Southern Denmark,

2021   Martin Christensen and Jeppe Vinkel Beier (Robotics), co-supervisor: Henrik Gordon Petersen, University of Southern Denmark
2019   Ashka Stephen (Computer Science), co-supervisor: Sayan Mukherjee, Duke University

ORGANIZATION OF CONFERENCES, SEMINARS AND WORKSHOPS

Conferences

2024   Co-organizer with Shira Faigenbaum and Ingrid Daubechies. Special session "Computational Techniques to Study the Geometry of the Shape Space" at Joint Mathematics Meetings. San Francisco, CA, USA.
2023   Co-organizer with Jørgen Ellegaard Andersen, Peter van Loock, Damian Markham. Special session "Quantum computing in its NISQ era'" at Nordic Congress of Mathematics. Aalborg, Denmark.

Seminars

2016   Co-organizer with Sarah Ritchey. Math Graduate-Faculty Seminar. Duke University.
2015   Co-organizer with Sarah Ritchey. Math Graduate-Faculty Seminar. Duke University.

PROFESSIONAL SERVICE

Reviewer: Electronic Journal of Statistics, IEEE BITS Magazine, American Journal of Physical Anthropology

HONORS AND AWARDS

2020   SIAM Early Career Travel Award
2019   SIAM Student Travel Award
2014   Phi Beta Kappa, Agnes Scott College
2014   Outstanding Presentation Award, Joint Mathematics Meetings
2013   Wilson Asbury Higgs Mathematics Scholarship, Agnes Scott College
2013   Highest Honor, Budapest Semesters in Mathematics
2013   Departmental Award for Excellence in Study, Agnes Scott College