

Kourosh Sayar Dogahe

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Research Interests

- Computational Materials Science
- Mechanical Behaviour of Materials
- Finite Element Analysis of Materials
- Modelling of Polymers and Composite Materials

Education

Ghent University

Ghent, Belgium

PhD in Materials Science and Engineering

Apr 2024 – Present

- **Thesis:** Modelling and simulation of materials behaviour using finite element analysis (FEA).
- **Keywords:** Finite element analysis, materials mechanics, computational modelling, Multi-scale Simulations

Tehran Polytechnique

Tehran, Iran

MEng in Advanced Materials and Processing

Sep 2016 – Feb 2019

- **Thesis:** Relation between dynamic mechanical properties and impact resistance of poly(vinyl alcohol) (PVA) hydrogel / halloysite nanotubes composites.
- **Courses:** Polymer rheology, advanced molecular spectroscopy, advanced polymeric fibres.

Professional Experience

Ghent University (Universiteit Gent)

Ghent, Belgium | On-site

PhD Researcher in Materials Science and Engineering

Apr 2024 – Present | Full-time

- VLAIO-funded PhD project (ICON Projects) in collaboration with Vandewiele, Picanol and Sioen Companies.
- Focus on multi-scale modelling of materials behaviour using finite element analysis (FEA).
- Develop and validate numerical models for mechanical response under different loading conditions.
- Build and maintain simulation tools and reports for academic publications and industrial partners.
- **Technical skills:** Abaqus (UMAT, VUMAT), COMSOL Multiphysics, SolidWorks (simulation), finite element analysis, numerical modelling, scientific computing, LaTeX.

QBee B.V. Company

Leuven, Belgium | On-site

Quantum Computing Research Assistant

Mar 2022 – Dec 2023 | Full-time

- Developed computational models for molecular and materials systems using advanced numerical methods.
- Designed and tested algorithms to improve accuracy and efficiency of simulations.
- Explored quantum and quantum-inspired approaches for modelling complex physical systems.
- Implemented simulation workflows in Python and scientific libraries for data analysis and visualisation.
- **Technical skills:** Python, scientific computing, numerical modelling, LaTeX.
- **Soft skills:** Teamwork, time management, communication, presentation skills.

Gil Fanavar Knowledge-Based Enterprise

Rasht, Iran | On-site

R & D Researcher

Aug 2019 – Dec 2021 | Full-time

- External R&D and chemistry lab support for companies in the chemical industry.
- **Technical skills:** Wet chemistry, analytical methods, lab safety, technical reporting.
- **Soft skills:** Client communication, problem solving, teamwork.

Razi Metallurgical National Research Center

Tehran, Iran | On-site

Lab Technician Internship

Feb 2019 – June 2019 | Full-time

- XRD data analysis, lab work, reporting and documentation.
- **Technical skills:** XRD data processing, sample preparation, lab equipment handling.

Publications & Presentations

Journal Papers

- **K. S. Dogahe**, R. Zheng, W. Van Paepegem, L. Daelemans. “Twisted Yarn Micro Scale Mechanics with Integrated Property Scatter: A Predictive Virtual Fiber FE Model”, *Textiles*, 2024. DOI: [10.0000/textiles.000000](#)
- R. Zheng, T. Verplanken, **K. S. Dogahe**, W. Van Paepegem, L. Daelemans. “Investigation of Textile Stitching Connections: Numerical Modeling and Validation”, *Composites Part B: Engineering*, accepted, 2024. DOI: [10.0000/compositesb.000000](#)

- R. Zheng, R. Bai, **K. S. Dogahe**, W. Van Paepegem, L. Daelemans. “Numerical prediction of the in-plane bending properties of fibrous reinforcements using a mesoscopic virtual fiber finite element approach”, manuscript under review, 2024. DOI: [10.0000/virtualfiber.000000](https://doi.org/10.0000/virtualfiber.000000)
- **K. S. Dogahe**, T. Sarac, D. De Smedt, K. Bertels. “Toward Metal-Organic Framework Design by Quantum Computing”, arXiv preprint arXiv:2309.05465, 2023. [10.1002/2309.05465](https://arxiv.org/abs/2309.05465)
- **K. S. Dogahe**, M. Haghighat Kish, S. Akbari. “Physico-mechanical properties of poly(vinyl alcohol), poly(vinyl alcohol)/boric acid, and poly(vinyl alcohol) nanocomposites incorporated with amino-functionalized and pristine halloysite nanotubes films”, *Journal of Applied Polymer Science*, Vol. 139, Issue 1, 2022. [10.1002/app.51424](https://doi.org/10.1002/app.51424)

Book Interpretation

- Persian interpretation of J. R. Howell et al., “Thermal Radiation Heat Transfer”, Taylor & Francis, 6th edition.

Conferences

- **Attendance**, IEEE Quantum Week – IEEE International Conference on Quantum Computing and Engineering (QCE21), October 17–22, 2021.
- Kouhro, N., Khankeshipour, B., **K. S. Dogahe**, Salkhorde Ziabari, M. (2018). “Antibacterial and antifungal effects of copper nanoparticles *in vitro*”, ICSK, Sydney, Australia.
- **K. S. Dogahe**, M. Haghighat Kish, S. Akbari (2018). “Improve dynamic mechanical properties and impact resistance of poly(vinyl alcohol) by halloysite nanotubes”, 8th International Istanbul Conference on Evolution Technical Textile (ETT2018), Istanbul, Turkey.

Presentations

- **Speaker**, “Quantum Advantage for Sustainability”, Bitkom Quantum Summit, Berlin, Germany, 2023.
- **Interview**, “Chemists explore quantum solutions on Climate Challenge with Qiskit”, IBM team interview, New York, USA, 2023.
- **Pitch presentation**, Deloitte Quantum Climate Challenge 2023, Hannover, Germany, 2023.

Scientific Projects

PhD Project – Materials Modelling and Simulation

Ghent University (Universiteit Gent)

Ghent, Belgium

Apr 2024 – Present

- VLAIO-funded PhD project (ICON Projects) in collaboration with Vandewiele, Picanol, Sioen Companies
- Development of a predictive virtual fibre finite element model for twisted yarn micro-scale mechanics with property scatter.
- Numerical modelling and validation of textile stitching connections for industrial textile applications.
- Numerical prediction of in-plane bending properties of fibrous reinforcements using a mesoscopic virtual fibre FE approach.
- Micro-scale finite element simulation of nonwoven materials for Beaulieu.
- High-performance industrial rope simulation for marine applications for Bexco.
- Investigation of mark formation on fabric during weaving for Picanol.
- Optimisation of fabric take-up in weaving machines for Picanol.
- Study of the dynamic effect of yarn unwinding at the yarn feeder in weaving machines for Vandewiele.
- Finite element simulation of an underwater balloon lifting system for Sioen.

Research Associate – Quantum Computing Projects

QBee B.V. Company

Leuven, Belgium

Mar 2022 – Jan 2023

- Worked on advanced numerical methods and algorithms for modelling complex molecular and materials systems.
- Developed and tested prototype Quantum inspired algorithms to improve accuracy and efficiency of large-scale simulations.
- Contributed to the design of new simulation workflows on high-performance and emerging computing platforms.
- Used Python and scientific libraries to build, run and analyse simulation pipelines using quantum algorithm to solve Potential Energy surface calculations.
- Collaborated with a multidisciplinary team on research reports and scientific publications.

Research Assistant – MSc Thesis Projects

Amirkabir University of Technology (Tehran Polytechnique)

Tehran, Iran

Oct 2016 – Feb 2019

- Electrospinning of poly(vinyl alcohol) hydrogel prepared by a combined sonochemistry and freeze–thaw method.
- Nanocomposite membrane prepared by electrospinning PES with multi-walled carbon nanotubes for oil/water separation.
- Surface modification of halloysite nanotubes by APTES to produce HNTs–APTES fillers for PVA bionanocomposites.

Supervisor – High School Research Projects

Rasht, Iran

National Organization for Development of Exceptional Talents (NODET)

Sep 2016 – Jul 2018

- Supervised student project on antibacterial and antifungal effects of copper nanoparticles.
- Supervised student project on inducing hydrophobicity to polyester fabric using silica nanoparticles.

Honors and Awards

2023	Winner (1st place) , Deloitte Quantum Climate Challenge 2023, 1st out of 58 teams link	Hannover, Germany
2019	Member , Iran National Elites Foundation (Presidency of Iran)	Tehran, Iran
2016	Ranked 6th , National master's university entrance exam among ~3000 participants	Tehran, Iran
2008	Ranked 1st , National Teen Khwarizmi Festival, invention category (shared 1st place)	Rasht, Iran

Teaching & Supervising

Ghent University (Universiteit Gent)

Ghent, Belgium | On-site

Teaching Assistant – Computer-Aided Design (Finite Element Method)

2024 – Present | Part-time

- Assist in teaching the Computer-Aided Design course using the finite element method to second-year master students.
- Support students with building FEA models and interpreting simulation results.
- Help prepare exercises, tutorials and feedback on assignments.

Ghent University (Universiteit Gent)

Ghent, Belgium

Student Supervisor – Master Theses

2024 – Present

- Supervise three master students on thesis projects in materials modelling and finite element analysis.
- Guide students on model design, parameter studies and validation of simulation results.
- Support students in writing their thesis and preparing presentations.

Ghent University (Universiteit Gent)

Ghent, Belgium

Student Supervisor – Bachelor Projects

2024 – Present

- Supervised two third-year bachelor projects (Vakoverschrijdend project or VOP) in materials science in two academic years.
- Helped students with project planning, basic finite element modelling and reporting.

QBee B.V. Company

Leuven, Belgium

Internship Student – Université Libre de Bruxelles

Jun 2023 – Aug 2023

- Implemented a 3D potential energy surface scan on a water molecule using the VQE algorithm in Qiskit.
- Tutored Qiskit and PySCF libraries python based algorithms.
- Gave introductions to computational materials science study inspired by quantum computing methods.

National Organization for Development of Exceptional Talents High School (NODET)

Rasht, Iran | On-site

Teacher of Quantum Physics

Sep 2016 – Jul 2018 | Part-time

- Taught two introductory courses on quantum physics and nanotechnology to first- and second-year high school students.

Farhang High School

Rasht, Iran | On-site

Teacher of Chemistry

Sep 2012 – May 2018 | Part-time

- Taught chemistry to final-year high school students preparing for the national university entrance exam (Konkoor).

Guilan University

Rasht, Iran | On-site

Undergraduate Teaching Assistant

Sep 2014 – Feb 2015 | Part-time

- Teaching assistant to Dr. Kamran Mahfouzi for the textures layout course (15–25 students).
- Prepared lectures and class activities and helped students during exercises.

Skills

Modelling & FEA	Abaqus (UMAT, VUMAT), COMSOL Multiphysics, SolidWorks (simulation), finite element analysis (FEA)
Programming	Python, MATLAB, FORTRAN, Qiskit, PennyLane, PySCF, Psi4, openQASM, Microsoft Azure
Materials Characterisation	XRD, NMR, FTIR, EDX, DLS, DSC, DMA, TGA, SEM, TEM, AFM, image processing
Laboratory Skills	Electrospinning, operation of thermal analysis instruments (DSC, DMA, TGA), optical microscopy
Soft Skills	Time management, teamwork, problem solving, documentation, scientific writing, presenting

Courses and Workshops

COMSOL Multiphysics	Course on multiphysics modelling and simulation in COMSOL, <i>online course, 2025</i>
SolidWorks	3D CAD modelling and basic simulation in SolidWorks, <i>online course, 2025</i>
Finite Element Modelling (Abaqus)	Course on nonlinear finite element analysis using Abaqus, <i>online course, 2024</i>
Research Presentation Pitch	Scientific sessions on presenting research and discovering peers' work, <i>Ghent University, Belgium, 2024</i>
Academic Writing Skills	Advanced Academic English – Writing Skills, <i>Ghent University, Ghent, Belgium, 2024</i>
High-Performance Computing	19th International Summer School on High-Performance Embedded Systems, <i>HiPEAC, Fiuggi, Italy, 2023</i>
Big Data Analysis	Big Data analysis and Strategy Workshop, <i>European Space Agency (ESA), Bruges, Belgium, 2023</i>
Qiskit Nature	Introduction to Qiskit Nature for computational chemistry applications, <i>IBM, US, 2022 (online)</i>
Applied Python	Applied Python for computational chemistry, Vinayak Bhat, <i>University of Kentucky, US, 2022 (online)</i>
Qiskit	Qiskit Global Summer School on Quantum Computational Chemistry, <i>IBM, US, 2021–2022 (online)</i>
Quantum Computing	Quantum Mechanics and Quantum Computation, <i>V. Vazirani, University of California, US, 2021 (online)</i>
Python Programming	From basic building blocks to advanced programming, <i>University of Michigan, US, 2021 (online)</i>
Electron Microscopy	SEM, TEM and AFM microscopy lab skills and data analysis, <i>National Nano Foundation, Tehran, Iran, 2020</i>
Crystallography	X-ray diffraction analysis and data processing in OriginPro, <i>National Nano Foundation, Tehran, Iran, 2020</i>

Languages & Extracurricular Activities

Languages

Persian: Native

English: Professional proficiency

Dutch: Elementary proficiency

Extracurricular Activities

- Amateur astronomy, reading, hiking and outdoor activities, playing Music, playing with cats, cooking

References

• Prof. Wim Van Paepegem

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• Prof. Lode Daelemans

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• Ir. Luka De Blok

PhD Researcher and colleague, Department of Materials, Textiles and Chemical Engineering, Ghent University
Ghent, Belgium

Email: luka.deblok@ugent.be

• Dr. Tamara Sarac

Former colleague at QBee B.V., Leuven, Belgium

Project officer at GERG (European Gas Research Group), Brussels, Belgium

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• Dr. Koen Bertels

Former CTO at QBee B.V., Leuven, Belgium

Researcher at FPGA House & QSentinel Companies, Zurich, Switzerland

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