Kadi Liis Saar

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Education

2014-	Department of Chemistry, Centre for Misfolding Diseases, University of Cambridge, UK PhD, biophysical chemistry
2010-2014	Trinity College, University of Cambridge, UK MEng, chemical engineering and biotechnology (IChemE accredited course) BA(Hons), chemical engineering
2009-2010	Repton School, Repton, Derbyshire, UK Advanced Levels - mathematics (A*), chemistry (A*), physics (A*) Advanced Subsidiary Levels - further mathematics (A), biology (A) Extensions Award (AEA) - mathematics (distinction)
1999-2011	Tallinn English College (1999-2009), Tallinn Secondary Science School (2008-2011), Estonia Certificate of high school education, gold medal from the Ministry of Education Certificate of secondary education, school medal for outstanding academic and extra-curricular achievements

Research Experience

2016-	Prof David Weitz' group, School of Engineering and Applied Sciences, Harvard University, USA Visiting fellow, developing high throughput single cell analysis techniques
2014-	Prof Tuomas Knowles' group, Centre for Misfolding Diseases, University of Cambridge, UK PhD degree, developing novel state-of-the-art tools for studying biological soft matter with a particular focus on protein, protein interactions and protein self-assembly
2013-2014	Prof Clemens Kaminski's lab, Dept. of Chemical Engineering, University of Cambridge, UK Masters degree, correlative super-resolution imaging techniques
2013	Prof Tuomas Knowles' group, Department of Chemistry, University of Cambridge, UK Summer student, microfluidic systems for label-free measurements on protein aggregation
2012	Merck Sharp & Dohme (MSD; pharmaceutical company), Hoddesdon, UK Summer student, controlled release of drugs from hot melt extrudates
2011	Compact Muon Soleniod (CMS) Group, Eur. Org. for Nuclear Research (CERN), Switzerland Summer student, characterisation of the distribution of dark matter
Dec 2011	Prof Toomas Tamm's group, Department of Chemistry, Tallinn Univ. of Technology, Estonia Computational chemistry project on conformational analysis of a bicyclic chiral alcohol.
Sep 2011	Prof Margus Lopp's group, Department of Chemistry, Tallinn University of Technology, Estonia Organic chemistry project on the synthesis of asymmetric bicyclic chiral alcohols

Work Experience

2018-	Scientific consultant (polymer chemistry), Kodasma majad, Tallinn, Estonia
2017-	Scientific consultant (microfluidic separation techniques), Fluidic Analytics, Cambridge, UK
2016-2017	Client Engagement Manager, Cambridge Innovation Consulting, Cambridge, UK
June 2015	Temporary analyst, Ministry of Economic Affairs and Communications, Tallinn, Estonia Optimal taxation schemes for the use of natural resources
2014-2016	Supervisor, Department of Chemical Engineering, University of Cambridge, UK "Process Calculations and Thermodynamics" and "Engineering Mathematics" courses across seven Cambridge Colleges
Jun 2014	Tutor, King A. Aziz and His Companions' Foundation for Giftedness & Creativity, Saudi Arabia Preparing Saudi Arabian high-school students for physics olympiad
2014	Part-time R&D specialist, Competence Centre for Cancer Research, Cambridge, UK
Sep 2012	Summer student, Enefit (Estonian Energy), Tallinn, Estonia & Frankfurt, Germany Participating in front-end design of a petrochemical upgrader, worked with process engineers on oil plant during hot commissioning

2011-	University of Tartu Youth Academy, Estonia Preparing Estonian teams for international olympiads in physics, chemistry and mathematics, proposing problems for national olympiads
2007-2014	Referee, Estonian Tennis Association, Tallinn, Estonia National and international tennis tournaments

Selected Awards & Prizes

2017	Runner-up prize, Department of Chemistry annual research showcase day
2016, 2017	Conference travel award, Rouse Ball Eddington Fund
2016	Short-term Fellowship (travel grant of €6900), European Molecular Biology Organisation
2016	Elected associate (incl. a travel grant of £3000), Nanoscience and nanotechnology doctoral training centre
2014	Fully funded PhD studentship (3.5 years), Engineering and Physical Sciences Research Council
2013	1st price and overall winner, Master's degree research project presentations, Department of Chemical Engineering, University of Cambridge
2013	Scholarship for Master's degree studies, Antti Piippo Fund
2013	Scholarship from the Frances & Augustus Newman Foundation donation to work as a summer student in the research group of Dr. Tuomas Knowles
2012, 2013	Senior Scholar, Trinity College, Cambridge
2012	British Petroleum Award for outstanding exam performance in chemical engineering
2012	Trinity College Science Essay Prize
2012	2012 Silver Award, science and technology articles, journal "Akadeemia"
2011-2018	Seven Full blues (tennis), record number in the history of Varsity tennis matches since 1947
2010	Finalist, National Students' Research Competition, Estonian Research Council
2009, 2010	Benoit Mandelbrot Scholar, Gifted and Talented Development Centre, Estonia
2009	The Headmasters' and Headmistresses' Conference Scholar, British Council (fully funded studies for on year at a British public or independent school)
2008	Active Young Citizen Award, Tallinn City Council, Estonia
2007-2010	1 gold and 5 bronze medals from international science and mathematics olympiads; plentiful awards in local and national rounds
2007, 2008	Estonian Junior Tennis Player of the Year, Estonian Tennis Federation
2007	Winner, TV show "Estonia's Got Talent"

Selected Positions of Responsibility

2019	Elected chair, Gordon Research Seminar in Microfluidics 2019, Hong Kong
2017	Member, Future of higher education and science funding think tank, Estonian Government Office
2017-	Founding member, Global Shapers Tallinn
2017	Student representative, departmental Graduate Education Committee
2016-2017	Vice-President responsible for sponsorship, Cambridge Univ. Technology and Enterprise Club
2015-	Chair, The Oxford & Cambridge Club Estonia
2014-	Elected student representative at the Trinity College Engineering Alumni Association
2013-2015	Member of Technical Committee, Cambridge University Societies Syndicate
2012-2014	President, Cambridge University Estonian Society
2012-2013	Vice-president, Trinity College Science Society Founder and organiser, Biotechnology lecture series, Cambridge University Biological Society
2011-2012	Director for Events and Logistics, Cambridge University Scientific Society Co-captain, Cambridge University Women's Tennis Team (blues) Elected Student Representative, departmental teaching-consultative committee
2010-2011	Captain, Trinity College Women's Squash Team
2010	Invited participant, panel "Estonia in 2018"

Publications

Herling TW, Levin A, **Saar KL**, Dobson CM, Knowles TPJ, Microfluidic approaches for probing amyloid assembly and behaviour. *Lab on a Chip*. 18(7), 999-1016.

Zhang Y, Yates EV, Hong L, **Saar KL**, Meisl G, Dobson CM, Knowles TPJ, (2018). On-chip measurements of protein unfolding from direct observations of micron-scale diffusion. *Chemical Science*, 9(14), 3503-3507.

Challa PK*, Peter QAE*, Wright MA, Zhang Y, **Saar KL**, Carozza JA, Benesch JLP, Knowles TPJ, (2018). Real-Time Intrinsic Fluorescence Visualization and Sizing of Proteins and Protein Complexes in Microfluidic Devices. *Analytical chemistry*, 90(6), 3849-3855.

Saar KL, Bombelli P, Lea-Smith DJ, Call T, Aro EM, Müller T, Howe CJ, Knowles TPJ (2018). Enhancing power density of biophotovoltaics by decoupling storage and power delivery. *Nature Energy*, 3(1), 75.

- Work received extensive media coverage (The Independent, Phys.org, EurekAlert!, AlphaGalileo etc.)

Perni M, Challa PK, Kirkegaard JB, Limbocker R, Koopman M, Hardenberg MC, Sormanni P, Müller T, **Saar KL**, Roode LWY, Habchi J, Vecchi G, Fernando NW, Casford S, Nollen EA, Vendruscolo M, Dobson CM, Knowles TPJ, (2018). Massively parallel *C. elegans* tracking provides multi-dimensional fingerprints for phenotypic discovery. *Journal of Neuroscience methods*, in press.

Saar KL*, Zhang Y*, Müller T, Challa PK, Devenish S, Lynn A, Łapińska U, Yang, X, Linse S, Knowles TPJ, (2018). On-chip label-free protein analysis with downstream electrodes for direct removal of electrolysis products. *Lab on a Chip*, 18(1), 162-170.

Łapińska U, **Saar KL**, Yates EV, Herling TW, Müller T, Challa PK, Dobson CM, Knowles TPJ, (2017). Gradient-free determination of isoelectric points of proteins on chip. *Physical Chemistry Chemical Physics*, 19(34), 23060-23067.

Kong L, **Saar KL**, Jacquat R, Hong L, Levin A, Gang H, Ye R, Mu B, Knowles TPJ, (2017). Mechanism of biosurfactant adsorption to oil/water interfaces from millisecond scale tensiometry measurements. *Interface focus*, 7(6), 20170013.

Saar KL, Yates EV, Müller T, Saunier S, Dobson CM, Knowles TPJ, (2016). Automated *ex situ* assays of amyloid formation on a microfluidic platform. Biophysical journal 110(3), 555-560

Michaels TCT, Dear AJ, Kirekgaard JB, **Saar KL**, Weitz DA, Knowles TPJ (2016). Fluctuations in the Kinetics of Linear Protein Self-Assembly. *Physical review letters* 116(25), 258103.

Saar, KL (2012). Why does the Higgs boson matter? (Review article). *Akadeemia*, 11, 1923-36.

Patents

Saar KL, Müller T, Knowles TPJ. GB1720627.7. Fluidic Apparatus and Methods. Filed by Cambridge Enterprise in 2017, licensed in 2018.

Research Supervising

Smith J, Master's degree thesis "Developing a Strategy for Investigating Thermal Amyloid Aggregation in a Real-Time, Label-Free Manner', Department of Chemistry, University of Cambridge, 2018.

International Conference Contributions

Saar KL, Arter WE, Zhang Y, Müller T, Charmet J, Kumar CP, Kong J, Herling T, Devenish SRA, Faherty J, Thorne C, Lynn A, Łapińska U, Yang X, Keyser UF, Linse S, Knowles TPJ. Biophysical on-chip analysis of proteins and their complexes. Talking molecules: the networks that shape the living world (Arbre Mobieu symposium), Warsaw, Poland, *Poster presentation*, 2018.

Saar KL, Müller T, Challa PK, Knowles TPJ. Microfluidic strategies to probe soft matter. 19th International Union for Pure and Applied Biophysics and 11th European Biophysical Societies' Associations congress, Edinburgh, UK, *Poster presentation*, 2017.

Saar KL, Müller T, Challa PK, Knowles TPJ. Microfluidic strategies to probe soft matter. Gordon Research Conference, Lucca, Italy, *Poster presentation*, 2017.

Saar KL, Integrating high electric fields with micro scale channels in conductive media. 68th New England Complex Fluids Workshop, Boston, US, *Oral contribution*, 2016.

Saar KL, Label-free high-field electrophoresis of proteins with direct removal of electrolysis products. Microfluidics 2016, EMBL Heidelberg, Germany, *Oral contribution*, 2016.

Saar KL, Zhang Y, Müller T, Devenish S, Knowles TPJ. Label-free high-field electrophoresis of proteins with direct removal of electrolysis products. Microfluidics 2016, EMBL Heidelberg, Germany, *Poster presentation*, 2016.

Saar KL High throughput *ex situ* measurement of protein aggregation on microfluidic platform. 4th International Symposium on Microchemistry and Microsystems, Hong Kong. *Oral Contribution*, 2016.

Saar KL, Yates EV, Müller T, Saunier S, Dobson CM, Knowles TPJ. Automated assays of protein amyloid formation on microfluidic platform. Lab-on-a-Chip and microfluidics Europe, Madrid, Spain, *Poster presentation*, 2016.

Saar KL, Biological photovoltaics vs. synthetic photovoltaics. 4th Annual meeting of the Centre for Protein Misfolding Diseases, *Oral Contribution*, 2015.

Uudsemaa M, **Saar KL**, Kriis K, Lopp M, Kanger T. Conformation analysis of 3-azabicyclo[3.2.0]heptane derivative, 17th International Workshop on Quantum Systems in Chemistry and Physics, Turku, Finland, *Poster presentation*, 2012.

Talks & Presentations

Saar KL, Müller T, Challa PK, Knowles TPJ. Microscale approaches for probing biological soft matter. 2nd Conference for Estonian Young Scientists Abroad, Estonian Academy of Sciences, Estonia, *Poster presentation*, 2018.

Saar KL, Microfluidic approaches for studying protein self-assembly. Sir Rodney Sweetnam Laboratory Opening, Cambridge, UK, *Invited talk*, 2017.

Saar KL, Enhancing the efficiencies of biological solar cells. Trinity Forum, Trinity College, Cambridge, UK, *Oral presentation*, 2017.

Saar KL, Novel strategies for probing biological complexes. Trinity College Biology Seminar Series, Cambridge, UK, *Oral presentation*, 2017.

Saar KL, Microfluidic approaches for studying biological soft matter. Physics of Nanoscale Systems, Cambridge, UK, *Invited talk*, 2017.

Saar KL, Microfluidic approaches for studying biological soft matter. British Petroleum Research Day, Cambridge, UK, *Invited talk*, 2017.

Saar KL, Microfluidic approaches for studying biological soft matter. Department of Chemistry Annual Research Showcase Day, Cambridge, UK, *Oral presentation*, 2017.

Saar KL, Microfluidic platform for analysing biological complexes. Trinity College graduate students' lunch time seminar, Cambridge, UK, *Oral presentation*, 2017.

Saar KL, Yates EV, Müller T, Saunier S, Dobson CM, Knowles TPJ. Automated assays of protein amyloid formation on microfluidic platform. Bridges in Medical Sciences Symposium, Cambridge, UK, *Poster presentation*, 2017.

Saar KL, Engineering microscale devices to study the physics of biological soft matter. Cambridge Soft Matter

Symposium, Cambridge, UK, *Oral presentation*, 2017.

Saar KL *Microfluidics* platform biotehnoloogilisteks rakendusteks. 1st Conference for Estonian Young Scientists Abroad, Estonian Academy of Sciences, Estonia, *Oral presentation*, 2016.

Saar KL Studying the biophysics of nanoscale processes with microfluidic tools. 10th Trinity College Science Society Annual Symposium, Cambridge, UK, *Oral presentation*, 2016.

Saar KL, Bombelli P, Müller T, Howe CJ, Knowles TPJ, Microscale Approaches to Improve the Efficiencies of Biological Photovoltaic Cells. 4th UK Solar Fuels Symposium, Cambridge, UK, *Poster presentation*, 2016.

Saar KL, Microfluidics in academic research. 6th Microfluidics Consortium, Cambridge, UK. *Invited talk*, 2015.
Saar KL Microfluidics as a Platform for Biotechnological Research. Department of Molecular and Cellular Biology, University of Tartu. *Invited guest lecture*, 2015.

Saar KL* Chan M*, Young L, Pinotsi D, Kaminski CF, Investigating Amyloid Fibril Growth and Protein Aggregation. Masters degree students research presentations, Department of Chemical Engineering, University of Cambridge. *Oral and poster presentation*, 2014.

Outreach

Saar KL, Life as a scientific researcher at Cambridge and Harvard Universities, University of Tartu Youth Academy. *Invited talk*, 2017.

Saar KL, Photolithography as a method to produce microfluidic devices, Cambridge Science Makers. *Invited talk*, 2015.

Saar KL, Why do I do it? TedXTallinn, Tallinn, Estonia, Invited talk, 2011.

Saar KL, What distinguishes Chemical Engineers from Chemists?, Annual Science School, Tallinn, Estonia (2013).

Selected Voluntary Projects

- Conference series "Estonian scientists abroad" - biannual event organised jointly with the Estonian Academy of Sciences; idea author and chair of the organising committee (2016, 2018)
- "Technology Ventures Conference" - annual conference organised by the Cambridge University Technology and Enterprise Club; responsible for sponsorship (2016)
- Cambridge Baltic Conference - largest international pan-Baltic Conference outside the Baltic countries; founder of the conference series (2013), chair of the first conference (2013) and a member of the organising committee (2014-2017)
- Trinity College Science Symposium - a day bringing together graduate researchers and research fellows of the College to present their research to the undergraduate student body; organiser (2012, 2013)
- iTeams - researching potential applications for porous microcapillary films and advising researchers on potential commercialisation; part of a 7-membered team of Cambridge University students (2012)

Additional Skills & Experience

- IT: familiar with Python, Matlab, Mathematica, AutoCad, Inkscape, MS Office etc; basic C++, Pascal, Unisim etc.
- Languages: Estonian (native); English (fluent); Russian (B1); French, Finnish, German (beginner)

- Tennis: Cambridge University Women's 1st team throughout university studies (2010-2017), record number of blues (representing Cambridge in a Varsity match against Oxford) in the club's history since 1947; Summer Universiade (World Student Games; 17th place; 2013), Estonian Junior Champion on 20 occasions (2004-2009); Junior World Ranking (career highest No. 672; 2008), European Ranking U16 (career highest No. 54; 2008), European Championships (2005-2008)
- Other sports: Represented College or school teams in athletics, rowing, swimming, squash, badminton, checkers, chess etc.

References available on request.