Kadi Liis Saar

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Education

2014-	Department of Chemistry, Centre for Misfolding Diseases, University of Cambridge, UK PhD, biophysical chemistry
2013-2014	Department of Chemical Engineering and Biotechnology, University of Cambridge, UK MEng (Hons), chemical engineering (IChemE accredited course)
2010-2013	Department of Chemical Engineering and Biotechnology, University of Cambridge, UK BA (Hons), chemical engineering and biotechnology
1999-2011	Tallinn English College (1999-2009), Tallinn Secondary Science School (2008-2011), Estonia Gold medal from the Ministry of Education; school medal for outstanding academic and extra-curricular achievements

Scientific Fellowships

2018	EPSRC Doctoral Fellowship for post-doctoral research, Engineering and Physical Sciences Research Council; single award across the School of Physical Sciences in 2018
2016	EMBO Short-term Fellowship & travel grant, European Molecular Biology Organisation
2014	Fully funded PhD studentship (3.5 years), Engineering and Physical Sciences Research Council

Selected Awards & Prizes

2017	Panel prize, research presentations by final year PhD students in the Department of Chemistry
2016, 2017	Conference travel grant, Rouse Ball Research & Eddington Fund
2016	Elected programme associate & travel grant recipient, Nanoscience and Nanotechnology Doctoral Training Centre, University of Cambridge
2014	Jaan Tallinn Scholar, participation at Centre for Applied Rationality workshop, San Francisco
2013	1st price and overall winner, research presentations by departmental master's degree students
2013	Antii Piippo Fund Scholarship for master's degree studies
2013	Scholarship from the Frances & Augustus Newman Foundation donation for summer research
2012	Senior Scholarship, Trinity College, Cambridge
2012	British Petroleum Award for outstanding exam performance
2012	Trinity College Science Essay Prize
2012	Silver Award, science and technology articles, journal "Akadeemia"
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)
2007-2010	1 gold and 5 bronze medals from international science and mathematics olympiads; plentiful awards in local and national rounds
2008	Active Young Citizen Award, Tallinn City Council, Estonia
2007	Winner, TV show "Estonia's Got Talent" (mental arithmetics)

Academic Positions of Responsibility

2019	Elected chair, Gordon Research Seminar in Microfluidics 2019, Hong Kong
2017	Member, Future of higher education & science funding think tank, Estonian Government Office
2016-	Founder & chair, biannual conference series "Estonian Scientists Abroad" organised jointly with Estonian Academy of Sciences
2014-	Elected student representative, Trinity College Engineering Alumni Association
2012-2013	Founder and organiser, Biotechnology lecture series, Cambridge University Biological Society Vice-president, Trinity College Science Society
2011-2012	Director for Events and Logistics, Cambridge University Scientific Society Elected Student Representative, departmental teaching-consultative committee

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 biophysical 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

Work Experience

2018-	Scientific consultant (polymer chemistry), Kodasma majad, Tallinn, Estonia
2017-	Scientific consultant (micron scale 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
2014-2016	Supervisor, Department of Chemical Engineering, University of Cambridge, UK Supervising 2^{nd} year undergraduate courses ("Process Calculations and Thermodynamics" and "Engineering Mathematics") 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
2011-	Lecturer, University of Tartu Youth Academy, Estonia Preparing Estonian teams for international olympiads in physics, chemistry and mathematics, proposing problems for national olympiads

Additional Positions of Responsibility

2018	Captain, joint Oxford and Cambridge blues tennis team
2017-	Founding member, Global Shapers Tallinn
2016-2017	Vice-President responsible for sponsorship, Cambridge Univ. Technology and Enterprise Club
2015-	Chair, The Oxford & Cambridge Club Estonia
2012-2014	President, Cambridge University Estonian Society
2011-2012	Co-captain, Cambridge University Women's Tennis Team (blues)
2010-2011	Captain, Trinity College Women's Squash Team

Additional Experience

- Tennis: Cambridge University Women's 1^{st} team throughout university studies (2010-2018), record number of blues (representing Cambridge in a Varsity match against Oxford) in the club's history since 1947; Summer Universiade (World Student Games; 17^{th} place; 2013), Junior World Ranking (career highest No. 672; 2008), European Ranking U16 (career highest No. 46; 2008); Estonian Junior Champion on 20 occasions (2004-2009); twice elected Junior Tennis player of the Year by the Estonian Tennis Federation.
- Other sports: Represented College or school teams in athletics, rowing, swimming, squash, badminton, checkers, chess etc.

Publications

1. Arter, WE, Charmet J, Kong J, **Saar KL**, Herling TW, Müller T, Keyser UF, Knowles TPJ (2018). Combined physical and chemical selection for enhanced specificity in protein sensing, *Analytical Chemistry*, 90(17), 10302-10310.

2. **Saar KL**, Müller T, Charmet J, Challa PK, Knowles TPJ (2018). Enhancing the resolution of free flow electrophoresis by spatially controlled sample collection. *Analytical Chemistry*, 90(15), 8998-9005.

3. Herling TW*, Levin A*, **Saar KL***, Dobson CM, Knowles TPJ (2018). Microfluidic approaches for probing amyloid assembly and behaviour. *Lab on a Chip*, 18(7), 999-1016.

4. 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.

5. 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.

6. **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.)*

7. 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*, 306, 57-67.

8. **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.

9. 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.

10. 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.

11. **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.

12. 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.

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

Patents

1. GB1720627.7. Fluidic Apparatus and Methods. Filed (2017) and licensed (2018).

2. GB1815360.1. Improvements in or relating to profiling of particles using microfluidic devices. Filed (2018).

3. GB1819033.0. Particle Characterization Using Optical Microscopy. Filed (2018).

4. GB1819029.8. Optical microscopy. Filed (2018).

Research Supervising

1. Smith J, Part III 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 Presentations

1. **Saar KL**, Peter QAE, Müller T, Kumar CP, Knowles TPJ. Rapid multidimensional protein characterisation in solution. MIcrofluidics for biological applications 2018, EMBL Heidelberg, Germany, *Poster presentation*, 2018.

2. **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.

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

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

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

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

7. **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.

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

9. **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.

10. **Saar KL**. Biological photovoltaics vs. synthetic photovoltaics. 4$^{\text{th}}$ Annual meeting of the Centre for Protein Misfolding Diseases, *Oral Contribution*, 2015.

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

Talks & Presentations at Local Meetings

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

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

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

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

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

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

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

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

9. **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.

10. **Saar KL**. Engineering microscale devices to study the physics of biological soft matter. Cambridge Soft Matter Symposium, Cambridge, UK, *Oral presentation*, 2017.

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

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

13. **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.

14. **Saar KL**. Microfluidics in academic research. 6th Microfluidics Consortium, Cambridge, UK. *Invited talk*, 2015.

15. **Saar KL**. Microfluidics as a Platform for Biotechnological Research. Department of Molecular and Cellular Biology, University of Tartu. *Invited guest lecture*, 2015.

16. **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.

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 of 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)

Selected Outreach Talks

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

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

3. **Saar KL**, What distinguishes Chemical Engineers from Chemists?, Annual Science School, Tallinn, Estonia, *Invited talk*, 2013.

4. **Saar KL**, The payoffs of reaching out to new challenges. "Entrum" Youth conference series, Pärnu, Estonia, *Invited talk*, 2012.

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