

Jasper Adamson

Date of birth 1st May, 1985

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Education

2010 – 2014 **St Anne's College, University of Oxford**

D.Phil. in Inorganic Chemistry and Crystallography. Thesis title '*Dimensionality-Property Relationships in Functional Hexahydroxytriphenylene- and Cyanide-Containing Materials*'. Thesis supervisor: Prof. Andrew Goodwin, Professor of Materials Chemistry, Inorganic Chemistry Laboratory, Oxford.

Collaborations with Dr Jeffrey Harmer (Inorganic Chemistry Laboratory, University of Oxford), Dr Paul Goddard (Department of Physics, University of Oxford), Dr Amber Thompson (Chemical Crystallography, University of Oxford), Dr Matthew Tucker (ISIS neutron source, STFC Rutherford Appleton Laboratory).

2004 – 2009 **Magdalene College, University of Cambridge**

B.A. and M.Sci. in Natural Sciences. Thesis title '*Fluoride-Free Cross-Coupling Methodology Using Disiloxanes: Synthesis of Terminal Aryl Acetylenes and Biaryl Compounds*'. Thesis supervisor: Prof. David Spring, Department of Chemistry, Cambridge.

1st class result for B.A. and 1st class result for M.Sci.

Field of specialization: Organic Chemistry. *Minor subjects:* Physics; Mathematics; Material Sciences.

2001–2004 **Tallinn Secondary Science School (Tallinna Reaalkool)**, Tallinn, Estonia

Professional experience

National Institute of Chemical Physics and Biophysics (Estonia)

Senior Research Fellow, Chemical Physics Laboratory
Oct 2018 — present

- A start-up grant PSG400 from the Estonian Research Council, €418,000 for 01.01.2020-31.12.2023, to investigate supramolecular carriers for drug delivery and in enzyme assays for drug discovery.
- Continued collaboration with Prof. Riina Aav and Dr. Dzmitry Kananovich at Tallinn University of Technology, particularly in NMR aspects of their work for sensors and catalysts.
- Senior researcher on Centre of Excellence TK134 (EQUiTANT), Emergent Orders in Quantum and Nanomaterials by Archimedes Foundation.
- Organising weekly science seminars for NICPB and Center of Excellence TK134.

Research Fellow, Chemical Physics Laboratory
Dec 2014 — Oct 2018

- Mobilitas Pluss postdoctoral grant, €66,000 for 2017 and 2018, to study synthesis and host-guest interactions of novel macrocycles with aromatic monomers.
- Collaborative projects with Tallinn University of Technology on supramolecular chemistry, utilizing NMR experiments for organic and supramolecular chemistry.
- Collaborators: Prof. Riina Aav (studies of dynamics and binding of hemicucurbiturils); Prof. Alexander Rebane (studies of fluorescent dyes); Dr. Dzmitry Kananovich (studies of structure of organometallic species).
- Chairing Young Scientists Journal Club Meetings.

**TBD Biodiscovery
(Estonia)**

Organic Synthetic
Chemist
Sept 2009 — June
2010

- TBD Biodiscovery focuses its activities towards synthetic chemistry and GMP production.
- Working in organic synthesis and as a project manager.

Scholarships, awards and fellowships

2020: A start-up grant PSG400 from the Estonian Research Council, €104,500 per annum (4 years)
2018: 3rd RSC BMCS Medicinal Chemistry Symposium on Macrocycles 2018, Stevenage, UK bursary, £400
2017: Mobilitas Pluss postdoctoral grant MOBJD39 from the Estonian Research Council, €66,000 (2 years)
2017: SMASH conference 2017, Italy, Baveno scholarship, €500
2012: The EPSRC scholarship for doctoral studies, £13,600 per annum (2 years)
2011: Estonian Student Funds in the USA scholarship for doctoral studies, \$3,000 per annum (3 years)
2011: IUCr Poster Prize at the British Crystallographic Association Spring Meeting
2011: UEKN scholarship for doctoral studies, \$1,500
2011: Estonian Educational Trust scholarship for doctoral studies, £500
2010: SA Archimedes Kristjan Jaak Scholarship for the first year of doctoral degree, £21,000 (1 year)
2010: Research Development Scholarship from St Anne's College, Oxford, £2,400 per annum (4 years)
2009: Magdalene College award for first class results for the M.Sci. Tripos exams
2009: Scholar of Magdalene College for first class results at the Tripos Exams (2005, 2008, 2009)
2008: P. M. S. Blackett Prize for B.A. degree course result for Part II
2005: Rolls Royce Armourers and Braisers Prize for the first year Material Science and Metallurgy exams
2004: Bronze Medal from the International Chemistry Olympiad in Kiel, Germany
2004: SA Archimedes Young Scientists Award for undergraduate studies, €3,200
2004: Tallinn Secondary Science School Foundation's award
2004: Scholarship from St Luke's Institute to study Natural Sciences, £2,000 per annum (5 years)
2004: Cambridge European Trust Scholarship, £2,000 per annum (5 years)
2004: Magdalene College Scholarship, £1,400 per annum (4 years)

Teaching

- Devised and completed a course on aspects of NMR for 9 PhD students at the Department of Chemistry and Biotechnology at the Tallinn University of Technology and Tallinn University in 2017-2018; the course lasted for two semesters, with my contribution to the course as teaching for 28 academic hours and an oral and written exam in the end.
- Taught lectures on supramolecular chemistry and NMR to PhD students at the Department of Materials and Environmental Technology at the Tallinn University of Technology in 2018, 2019 and 2020; each year 12 academic hours for lectures and practical classes.
- Taught lectures and practical classes to BA students at the Department of Cybernetics at the Tallinn University of Technology in 2020; total of 8 academic hours.
- Taught lectures and practical classes to BA students at the Institute of Physics at the Tallinn University of Technology in 2020; total of 10 academic hours.
- Taught tutorials and practical classes to undergraduate students while studying at the University of Oxford.

Key research interests

Organic Chemistry

- Synthesis of macrocyclic compounds and supramolecular cavitands for host guest binding and as vehicles in drug delivery.

Analytical Chemistry and NMR Spectroscopy

- Utilizing 1D and 2D NMR measurements; particular interest in variable temperature NMR studies and line shape analysis for kinetic parameters for supramolecular complexes. Knowledge in the area of line shape analysis of NMR spectra gained by close contact with late Prof. Hans Reich at the University of Wisconsin. The acquired skills include experiments to determine reaction order for the formation of supramolecular complexes; the spectral line shape analysis and utilizing the Eyring equation to result in activation enthalpy, entropy and Gibbs free energy values. Examples of this kind of analysis have led to the characterization of the transition state formation Gibbs free energy, enthalpy and entropy for inclusion of anions within the cavity of chiral hemicucurbit[8]uril binding site and to understanding mechanisms of dynamical exchange processes, whereby chiral hemicucurbit[12]uril undergoes changes in its conformation.

Crystallography

- Crystal growth and single-crystal and powder X-ray diffraction of host-guest complexes of macrocycles.

Personal endeavors

Language skills: English (C2), Estonian (C2), German (C1), Russian (A2), Finnish (A1).

Fundraising: Have raised over £1,500 in total for two charities, CAMFED – Campaign for Female Education and Mind, through participation in the British 10k London run twice.

Membership and activities in professional associations

2019 – present Member of Estonian Chemical Society

2018 – present Member of Royal Society of Chemistry

2014 – present Organising Science Seminars at the National Institute of Chemical Physics and Biophysics

2014 – 2015 Chairing Young Scientists Journal Club meetings at the National Institute of Chemical Physics and Biophysics

2010 – 2014 Member of the Institute of Physics of England

2010 – 2014 Member of British Crystallographic Association

2009 – 2009 Member of the National Chemistry Olympiad Organisation Committee in Estonia

Participation at conferences

(21) Peterson, A.; Ludvig, M. Martõnova, J.; Kaabel, S.; Uudsemaa, M.; Trummal, A.; Pehk, T.; Aav, R.; **Adamson, J.** (2019). New oxacalix[4]arene macrocycles: a conformational and interaction study. 15th International Conference on Calixarenes (Calix-2019), Cassis, France, PO-35.

(20) Martõnova, J.; Kaabel, S.; Šubin, K.; **Adamson, J.**; Aav, R. (2019). Poorsete metall-orgaaniliste võrgustike monokristallide püsivuse uurimine solvendivahetusel. XXXIV Eesti Keemiapäevad, Tallinn, Eesti, 18. aprill. Eesti Keemiaselts, 28.

(19) Peterson, A.; Kaabel, S.; Kahn, I.; Pehk, T.; Aav, R.; **Adamson, J.** (2018). Synthesis and Properties of Oxacalix[n]arenes. 13th International Symposium on Macrocyclic and Supramolecular Chemistry (ISMSC 2018), July 8-13, 2018, Quebec City, Quebec City Convention Centre, POSTER-035.ISMSC,.

- (18) Peterson, A.; Kaabel, S.; Kahn, I.; Pehk, T.; Aav, R.; **Adamson, J.** (2018). Synthesis and Properties of Oxacalix[n]arenes. International Conference on Organic Synthesis BOS 2018, July 1-4, 2018, Tallinn, Estonia, PO-80. BOS.
- (17) Peterson, A.; Kaabel, S.; Kahn, I. Pehk, T.; Aav, R.; **Adamson, J.** (2018). Synthesis and Interaction Studies of Oxacalix[n]arenes. In: .Macrocycles 2018 - 3rd RSC BMCS Medicinal Chemistry Symposium on Macrocycles, Stevenage, United Kingdom, October 8-9, 2018.
- (16) Peterson, A.; Kaabel, S.; Kahn, I. Pehk, T.; Aav, R.; **Adamson, J.** (2018). Synthesis and Interactions Studies of Oxacalix[n]arenes. In: .Xth Symposium on Nuclear Magnetic Resonance in Chemistry, Physics and Biological Sciences, Warsaw, Poland, September 26-28, 2018.
- (15) **Adamson, J.**; Kaabel, S.; Progrochenko, E.; Reich, H.J.; Rissanen, K.; Aav, R. (2017). Chiral Hemicucurbit[8]uril Complexation with Anionic Guests: an NMR Titration and Variable Temperature NMR Study. Small Molecule NMR Conference: Small Molecule NMR Conference, September 17-20, 2017, Baveno, Italy. SMASH,.
- (14) Peterson, A.; Kaabel, S.; Aav, R.; Pehk, T.; **Adamson, J.** (2017). "Synthesis and Properties of Oxacalix[n]arenes". AMPERE NMR School: The AMPERE NMR School, Zakopane, Poland, 25 June- 1 July 2017. Adam Mickiewicz University, P27.
- (13) Aav, R.; Kaabel, S.; Prigorchenko, E.; Fomitšenko, M.; Öeren, M.; Trunin, M.; **Adamson, J.**; Rissanen, K. (2016). Supramolecular Control in Hemicucurbiturils. International Symposium on Macrocyclic and Supramolecular Chemistry: 11 th International Symposium on Macrocyclic and Supramolecular Chemistry, July 10-14, 2016, The K-Hotel Seoul, Korea. ISMSC, PB037.
- (12) Kaabel, S.; **Adamson, J.**; Kalenius, E.; Topic, F.; Öeren, M; Löökene, A.; Rissanen, K.; Aav, R. (2016). Cyclohexanohemicucurbit[8]uril – a Neutral Host for Anionic Guests. 11th International Symposium on Macrocyclic and Supramolecular Chemistry: 11th International Symposium on Macrocyclic and Supramolecular Chemistry (ISMSC), Seoul, Korea, 11-14. July 2016. ISMSC-2016, PA051.
- (11) Kaabel, S.; **Adamson, J.**; Kalenius, E.; Topić, F.; Öeren, M.; Löökene, A.; Rissanen, K.; Aav, R. (2016). Cyclohexanohemicucurbit[8]uril – a neutral host for anionic guest. International Conference in Organic Synthesis: Balticum Organicum Syntheticum, Riga, Latvia, 3-6. July 2016. BOS, 80.
- (10) Kananovich, D. G.; **Adamson, J.**; Osadchuk, I.; Kudrjashova, M.; Lopp, M. (2016). Alkyltitanium ate complexes generated from alkylmagnesium halides and titanium TADDOLate: NMR and computational study. International Conference in Organic Synthesis: Balticum Organicum Syntheticum, Riga, Latvia, 3-6. July 2016. BOS, 84.
- (9) Kananovich, D. G.; **Adamson, J.**; Osadchuk, I. (2016). Alkyltitanium ate complexes as intermediates in asymmetric Kulinkovich reaction: NMR and computational study. Book of Abstracts: 9th Asian-European Symposium on Metal-Mediated Efficient Organic Synthesis, Stockholm, Sweden, September 4-7, 2016. Stockholm University,.
- (8) **Adamson, J.**; Funnell, N.; Thompson, A. Goodwin, A. (2013). Order-Disorder Phase Transition in Ice Confined to an Organic Crystal. The 28th Meeting of the European Crystallographic Association 25-29 August 2013, Warwick, United Kingdom.
- (7) **Adamson, J.** (2013). Proton Order-Disorder Transition in a Polar One-Dimensional Confined Ice. PCG-SCMP Winter Meeting "New Developments in UK Materials Crystallography".
- (6) **Adamson, J.**; Thompson, A. Goodwin, A. (2011). Studies of Hexahydroxytriphenylene. Oxford Symposium on Quantum Materials 2011 Wolfson College, 6 May 2011.
- (5) **Adamson, J.** (2011). A Curious Case of Hexahydroxytriphenylene. In: (P43).2011 BCA Spring Meeting, Keele University, 12-14th April 2011, Keele, United Kingdom.
- (4) Irha, N., **Adamson, J.**, Adamson, K., Steinnes, E., Kirso, U. (2009). Combustion ash in terrestrial system, mobility of main and trace compounds and their environmental effects. International Oil Shale Symposium, Tallinn, Estonia, June 8-11. 82.
- (3) Kirso, U., Steinnes, E., Irha, N., **Adamson, J.**, Adamson, K. (2008). The use of oil shale ash for agriculture exploring the environmental significance of matrix effects. 9th European Meeting on Environmental Chemistry (EMEC 9), December 3-6, Girona, Catalonia, Spain. 50.

- (2) Kirso, U.; Steinnes, E.; Urb, G.; Teinemaa, E.; Kettrup, A.; Gebefügi, I.; **Adamson, J.**; Adamson, K. (2006). Levels of priority pollutants in ambient air of Estonia. 7th European Meeting on Environmental Chemistry EMEC7, OP3, Dec. 6-9. Brno, Czech Republic.
- (1) Kirso, U.; Kettrup, A.; Gebefügi, I.; Teinemaa, E.; Laja, M.; Urb, G.; Tamm, E.; **Adamson, J.**; Adamson, K. (2004). Trends in the air quality in Tallinn (Estonia). 5th European Meeting on Environmental Chemistry, EMEC5, Dec. 15-18. Bari, Italy.

List of peer-reviewed publications

- (22) Hu, X.; Yin, Z.; Guo, J.; **Adamson, J.**; Fujiki, M.; Borovkov, V. Stereospecific Synthesis of Cyclic Sulfite Esters with Sulfur-Centered Chirality via Diastereoselective Strategy and Intramolecular H-Bonding Assistance. *J. Org. Chem.* **2021**, *86*, 379–387.
- (21) Mishra, K. A.; **Adamson, J.**; Öeren, M.; Kaabel, S.; Fomitšenko, M.; Aav, R. Dynamic Chiral Cyclohexanohemicucurbit[12]Urils. *Chem. Commun.* **2020**, *56*, 14645–14648.
- (20) Peterson, A.; Ludvig, M.-L.; Martonova, J.; Kaabel, S.; Kerner, P.; Uudsemaa, M.; Trummal, A.; Fomitšenko, M.; Pehk, T.; Aav, R.; **Adamson, J.** New Oxacalix[4]Arene Carboxylate Detects Viologen in Protic Media. *Supramol. Chem.* **2020**, *32*, 313–319.
- (19) Konrad, N.; Meniailava, D.; Osadchuk, I.; **Adamson, J.**; Hasan, M.; Clot, E.; Aav, R.; Borovkov, V.; Kananovich, D. Supramolecular Chirogenesis in Zinc Porphyrins: Complexation with Enantiopure Thiourea Derivatives, Binding Studies and Chirality Transfer Mechanism. *J. Porphyr. Phthalocyanines* **2020**, *24*, 840–849.
- (18) Prigorchenko, E.; Kaabel, S.; Narva, T.; Baškir, A.; Fomitšenko, M.; **Adamson, J.**; Järving, I.; Rissanen, K.; Tamm, T.; Aav, R. Formation and Trapping of the Thermodynamically Unfavoured Inverted-Hemicucurbit[6]uril. *Chem. Commun.* **2019**, *55*, 9307–9310.
- (17) Ustrnül, L.; Kaabel, S.; Burankova, T.; Martõnova, J.; **Adamson, J.**; Konrad, N.; Burk, P.; Borovkov, V.; Aav, R. Supramolecular Chirogenesis in Zinc Porphyrins by Enantiopure Hemicucurbit[n]urils (n = 6, 8). *Chem. Commun.* **2019**.
- (16) Iskryk, M.; Barysevich, M.; Ošeka, M.; **Adamson, J.**; Kananovich, D. Asymmetric Kulinkovich Hydroxycyclopropanation of Alkenes Mediated by Titanium (IV) TADDOLate Complexes. *Synthesis (Stuttg.)* **2019**, *51*, 1935–1948.
- (15) Ermolovich, Y.; Barysevich, M. V.; **Adamson, J.**; Rogova, O.; Kaabel, S.; Järving, I.; Gathergood, N.; Snieckus, V.; Kananovich, D. G. Site-Selective and Stereoselective C–H Functionalization of N-Cyclopropylamides via a Directed Remote Metalation Strategy. *Org. Lett.* **2019**, *21*, 969–973.
- (14) Peterson, A.; Kaasik, M.; Metsala, A.; Järving, I.; **Adamson, J.**; Kanger, T. Tunable Chiral Triazole-Based Halogen Bond Donors: Assessment of Donor Strength in Solution with Nitrogen-Containing Acceptors. *RSC Adv.* **2019**, *9*, 11718–11721.
- (13) Balciunas, S.; Peterson, A.; Ivanov, M.; **Adamson, J.**; Banys, J. Dielectric Properties of One-Dimensional Ice in HHTP-4H(2)O Crystallites. *Ferroelectrics* **2018**, *533*, 192–197.
- (12) **Adamson, J.**; Nazarski, R. B.; Jarvet, J.; Pehk, T.; Aav, R. Shortfall of B3LYP in Reproducing NMR J(CH) Couplings in Some Isomeric Epoxy Structures with Strong Stereoelectronic Effects: A Benchmark Study on DFT Functionals. *ChemPhysChem* **2018**, *19*, 631–642.
- (11) Peterson, A.; Kaabel, S.; Kahn, I.; Pehk, T.; Aav, R.; **Adamson, J.** Unsubstituted Oxacalix[n]arenes (N= 4 and 8): A Conformational Study in Solution and Solid State and Interaction Studies with Aromatic Guests. *ChemistrySelect* **2018**, *3*, 9091–9095.
- (10) Kaabel, S.; **Adamson, J.**; Topić, F.; Kiesilä, A.; Kalenius, E.; Öeren, M.; Reimund, M.; Prigorchenko, E.; Lõokene, A.; Reich, H. J.; *et al.* Chiral Hemicucurbit[8]uril as an Anion Receptor: Selectivity to Size, Shape and Charge Distribution. *Chem. Sci.* **2017**, *8*.
- (9) Tepp, K.; Puurand, M.; Timohhina, N.; **Adamson, J.**; Klepinin, A.; Truu, L.; Shevchuk, I.; Chekulayev, V.; Kaambre, T. Changes in the Mitochondrial Function and in the Efficiency of Energy Transfer Pathways during Cardiomyocyte Aging. *Mol. Cell. Biochem.* **2017**, *432*.
- (8) Jefimova, J.; **Adamson, J.**; Reinik, J.; Irha, N. Leaching of PAHs from Agricultural Soils Treated with Oil

Shale Combustion Ash: An Experimental Study. *Environ. Sci. Pollut. Res.* **2016**.

- (7) **Adamson, J.**; Lucas, T. C.; Cairns, A. B.; Funnell, N. P.; Tucker, M. G.; Kleppe, A. K.; Hriljac, J. A.; Goodwin, A. L. Competing Hydrostatic Compression Mechanisms in Nickel Cyanide. *Phys. B Condens. Matter* **2015**, *479*, 35–40.
- (6) **Adamson, J.**; Funnell, N.; Thompson, A.; Goodwin, A. Hydrogen Bond Order/Disorder in a Polar One-Dimensional Confined Ice. *Acta Crystallogr. Sect. A Found. Adv.* **2014**, *70*, C532.
- (5) **Adamson, J.**; Hodgson, S.; Hunt, S.; Cliffe, M.; Cairns, A.; Thompson, A.; Tucker, M.; Funnell, N.; Hriljac, J.; Lucas, T.; *et al.* Contrasting Compressibility Trends in Layered Structures Ag(Tcm) and Ni(CN)₂. *Acta Crystallogr. Sect. A Found. Adv.* **2014**, *70*, C266.
- (4) Hodgson, S. A.; **Adamson, J.**; Hunt, S. J.; Cliffe, M. J.; Cairns, A. B.; Thompson, A. L.; Tucker, M. G.; Funnell, N. P.; Goodwin, A. L. Negative Area Compressibility in Silver(I) Tricyanomethanide. *Chem. Commun.* **2014**, 50.
- (3) **Adamson, J.**; Funnell, N. P.; Thompson, A. L.; Goodwin, A. L. Structural Investigation of a Hydrogen Bond Order-Disorder Transition in a Polar One-Dimensional Confined Ice. *Phys. Chem. Chem. Phys.* **2014**, *16*.
- (2) **Adamson, J.**; Thompson, A. L.; Goodwin, A. L. A Curious Case of Hexahydroxytriphenylene. *Acta Crystallogr. Sect. A Found. Adv.* **2011**, *67*, C406.
- (1) **Adamson, J.**; Irha, N.; Adamson, K.; Steinnes, E.; Kirso, U. Effect of Oil Shale Ash Application on Leaching Behavior of Arable Soils: An Experimental Study. *Oil Shale* **2010**, *27*, 250–257.

Link to Estonian Research Information System:

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