Simon Foster

+44 (0)1904 325424
simon.foster@york.ac.uk, simondf@gmail.com
http://www.cs.york.ac.uk/~simonf
http://uk.linkedin.com/in/simondfoster

Personal

Full Name	Dr. Simon David Foster
Date of Birth	25th of August, 1983
Nationality	British
Current Role	Post-Doctoral Research Fellow (Grade 7), University of York
Department	Computer Science
Appointment Date	13/03/2012

Academic Qualifications

2009 **PhD, Computer Science,** University of Sheffield

2005 **MComp (Hons) Computer Science** (First Class), University of Sheffield

2001 ***A-Levels***: Computing, Mathematics, and Physics

Education & Employment

Apr 2015 – December 2017 **Research Fellow, EU H2020 ICT-1 Project**
"Integrated Tool Chain for Model-based Design of Cyber-Physical Systems" (INTO-CPS)
University of York under Prof. Jim Woodcock, http://into-cps.au.dk

Oct 2014 – Mar 2015 **Research Associate, QinetiQ sponsored**
Modular Safety Cases for the Generic Vehicle Architecture
University of York under Prof. Tim Kelly

Mar 2012 – Sep 2014 **Research Associate, EU FP7 Project 287829**
"*Comprehensive Modelling for Advanced Systems of Systems" (COMPASS)*
University of York under Prof. Jim Woodock. http://www.compass-research.eu

2009-2012 **Research Associate, EPSRC Project EP/G031711/1**
"Higher Order Refinement Techniques for the Model Driven Architecture"
University of Sheffield under Prof. John Derrick

Summer 2009 **Short-term Research Assistant on "Bridging the Gaps" investigation**
"Resource optimisation for modular speech recognition systems"
Principal Investigator: Dr. Thomas Hain

2005-2009 **PhD, University of Sheffield, funded by EPSRC Departmental Scholarship**
"A Compositional Semantic Theory for Service Composition"
Supervisor: Dr. Mike Stannett

2001-2005 **MComp (Hons) Computer Science,** University of Sheffield

Training & Experience

July 2017 **Proposal writing and administrative support for EPSRC VETSS project** "Mechanised Assume-Guarantee Reasoning for Control Law Diagrams via Circus" (successful bid, worth £82k)

March 2017 **Guest Lecture on "Programming: Correctness by Construction" (PCOC) Undergraduate Module**

Feb 2017 **EU project review in Brussels, WP2 Deliverables** (accepted)

October 2016 **Lecturer at ICTAC Tutorial Series, Taiwan**

Jan-Feb 2015 **Lecturing on "Formal Specification" (FMSP) Masters Module**

Jan 2015 **Proposal writing on two bids under JLR-EPSRC TASCC funding scheme** *"Towards Autonomy – Smart and Connected Control"* (pending)

Nov 2014 **EU project review in Brussels, Refinement Tool Deliverable** (accepted)

Sep 2014 **Headed a EU H2020 FET-Open project bid** (*"CyVeriPhy"*)

Aug 2014 **Assistant Lecturer at Marktoberdorf Summer School on Dependable Software Systems Engineering.** Co-lecturing *"Electronic UTP: Mechanised Unifying Theories of Programming"* with Prof. Jim Woodcock.

July 2014 **Dissemination of COMPASS project results** to PICASSOS industrial consortium at National Railway Museum

	May 2014 **Lecturer at FM Tutorial Series, Singapore.** Co-lecturing *"Unifying Theories of Programming in Isabelle/HOL"* with Prof. Jim Woodcock. *Jan-Apr 2014* **Proposal writing and administrative support for two EU H2020 proposals under ICT1** (one of which, INTO-CPS, was a successful bid - *€7m funded, €950k to York*) *Jan 2014* **Presenter at research outreach event to "COMPASS Interest Group"** of interested industrial parties in Amsterdam *Nov 2013* **EU project review in Brussels, Theorem Prover Deliverable** (accepted) *Aug 2013* **Lecturer at ICTAC School on Software Engineering, Shanghai.** Teaching course on *Unifying Theories of Programming in Isabelle.* *Summer 2013* **Supervision of mathematics undergraduate intern** (exploring interest in doing future PhD in the department) *Aug 2011* **Visiting Researcher at McMaster University.** Host Dr. Wolfram Kahl. *Apr 2006 and 2007* **Midlands Graduate School in Foundations of Computer Science** *Jun 2006* **Visiting Researcher at Knowledge Media Institute, Open University** *May 2010* **Workshop on Automated Theory Engineering** Workshop organised by Tony Griffin, Mike Gordon, Tony Hoare and Georg Struth. *1998* **Work Experience: Software Engineer at MHG Systems Ltd.** Maintenance of hardware and software for electronic point of sale (EPoS) systems **Programming Languages**: Java (incl. Eclipse SDK), Scala, Haskell, Isabelle/HOL, ML, Agda, Python, PHP, HTML, Unix Shell Scripting
Research Interests	**Theorem Proving** (Isabelle/HOL) **Cyber-Physical Systems** **Unifying Theories of Programming** **Formal Methods** (Z, VDM, Circus) **Formal Semantics** **Functional Programming** **Algebra Mechanisation** **Web service composition** **Systems of Systems** **Modular Safety Cases** **Model-Driven Architecture** **Process Algebra**
Publications	S.Foster, S. Canham, A. Cavalcanti, J. Woodcock, F. Zeyda. **Unifying Theories of Reactive Design Contracts.** In preparation for Theoretical Computer Science. S. Foster, A. Cavalcanti, J. Woodcock, F. Zeyda. **Unifying Theories of Time with Generalised Reactive Processes.** Submitted to Information Processing Letters. May 2017. F. Zeyda, J. Ouy, S. Foster, and A. Cavalcanti. **Formalised Cosimulation Models.** 1st Workshop on Formal Co-simulation of Cyber-Physical Systems (CoSim-CPS). 2017. LNCS (to appear). S. Foster and F. Zeyda. **Optics in Isabelle.** Archive of Formal Proofs. 2017. S. Foster and J. Woodcock. **Towards Verification of Cyber-Physical Systems with UTP and Isabelle/HOL.** Concurrency, Security, and Puzzles. 2017. LNCS 10160. S. Foster, F. Zeyda, and J. Woodcock: **Unifying Heterogeneous State-Spaces with Lenses.** Proc. 13th Intl. Colloq. on Theoretical Aspects of Computing (ICTAC). October 2016. LNCS 9965. P. G. Larsen, J. Fitzgerald, J. Woodcock, R. Nilsson, C. Gamble, S. Foster: **Towards Semantically Integrated Models and Tools for Cyber-Physical Systems Design.** Proc. 7th Intl. Symp. on Leveraging Applications of Formal Methods (ISoLA). 2016. LNCS 9952

J. Woodcock, S. Foster, and A. Butterfield: **Heterogeneous Semantics and Unifying Theories.** Proc. 7th Intl. Symp. on Leveraging Applications of Formal Methods (ISoLA). 2016. LNCS 9952

J. Woodcock and S. Foster: **UTP by Example: Designs.** 2nd Intl. School on Engineering Trustworthy Software Systems (SETSS). 2016. LNCS 10215

S. Foster, B. Thiele, A. Cavalcanti, and J. Woodcock: **Towards a UTP Semantics for Modelica.** Proc. 6th Intl. Symp. on Unifying Theories of Programming (UTP). 2016. LNCS 10134

F. Zeyda, S. Foster, and L. Freitas: **An Axiomatic Value Model for Isabelle/UTP.** Proc. 6th Intl. Symp. on Unifying Theories of Programming (UTP). 2016. LNCS 10134

S. Foster and J. Woodcock: **Mechanised Theory Engineering in Isabelle.** NATO Advanced Study Institute on Dependable Software Systems Engineering. Eds: M. Irlbeck, D. Peled, and A. Pretschner. IOS Press, 2015

S. Foster and G. Struth: **On the Fine-Structure of Regular Algebra.** Journal of Automated Reasoning 54:2. February 2015

J. Woodcock, A. Cavalcanti, J. Fitzgerald, S. Foster, P. G. Larsen: **Contracts in CML.** 6th International Symposium on Leveraging Applications of Formal Methods, Verification, and Validation (ISoLA). LNCS. October 2014

S. Foster, F. Zeyda, and J. Woodcock: **Isabelle/UTP: A Mechanised Theory Engineering Framework.** 5th International Symposium on Unifying Theories of Programming. LNCS 8963. May 2014

S. Foster, A. Miyazawa, J. Woodcock, A. Cavalcanti, J. Fitzgerald, P. G. Larsen: **An approach for managing semantic heterogeneity in systems of systems engineering.** IEEE 9th International Systems of Systems Engineering Conference. 2014

S. Foster and G. Struth: **Regular Algebras.** Archive of Formal Proofs. 2014.

L. D. Couto, S. Foster, and R. Payne: **Towards Verification of Constituent Systems through Automated Proof.** Workshop on Engineering Dependable Systems of Systems (EDSoS). April 2014

S. Foster and J. Woodcock: **Unifying Theories of Programming in Isabelle.** ICTAC School on Software Engineering. 2013. LNCS 8050

S. Foster and G. Struth: **Automated Analysis of Regular Algebra.** 6th International Joint Conference on Automated Reasoning (IJCAR). 2012. LNCS 7364

S. Foster, O. Rypáček, and G. Struth: **Correctness of Object Oriented Models by Extended Type Inference.** 9th Intl. Colloquium on Theoretical Aspects of Computing (ICTAC). 2012. LNCS 7521

A. Armstrong, S. Foster and G. Struth: **Dependently Typed Programming Based on Automated Theorem Proving.** 11th Intl. Conference on Mathematic of Program Construction (MPC). 2012. LNCS 7342

S. Foster, G. Struth, and T. Weber: **Automated Engineering of Relational and Algebraic Methods in Isabelle/HOL.** Proc. 12th Intl. Conf. on Relational and Algebraic Methods in Computer Science (RAMiCS). 2012. LNCS 6663.

S. Foster, G. Struth: **Integrating an Automated Theorem Prover into Agda**. 3rd NASA Formal Methods Symposium (NFM). 2011. LNCS 6617

B. Norton, S. Foster, Andrew Hughes: **A Compositional Operational Semantics for OWL-S.** Intl. Workshop on Web Services and Formal Methods (WS-FM). 2005. LNCS 3670

Thesis	*"A compositional algebraic theory for service composition and verification"*
Teaching	**Formal Specification**. I jointly lectured on the Formal Specification course in the Department of Computer Science at the University of York in January 2015. This course trains students in the use of the Z notation for formally specifying and verifying systems. **Postgraduate Schools**. I have lectured at postgraduate schools at ICTAC 2013, FM 2014, Marktoberdorf 2014, ICTAC 2016, FM 2016, and INTO-CPS 2017 teaching on Cyber-Physical Systems, Unifying Theories of Programming, and Isabelle/HOL. These included live demonstrations using Isabelle. **Tutorials**. In the context of the COMPASS project I have lead tutorials on modelling using the CML language for our industrial partners, academic partners, and members of the COMPASS Interest Group. In addition, I have demonstrated and taught on the following undergraduate courses: **Programming: Correctness by Construction**, a final year module at York. **Foundations of Computer Science**, a first year foundation course at Sheffield in propositional logic, set theory, algebra, and proof. **Abstract Datatypes** (Advanced Functional Programming), which looks at various aspects of functional programming in Haskell, with a particular slant on abstract datatypes. I gave lectures in Sheffield on Monads. **Theory of Distributed Systems**, undergraduate module at Sheffield which looks at theoretical representation and verification of concurrent systems in *Process Algebra.* The course has looked at CCS, π-calculus, CSP and associated model checkers. I took problem and lab classes, as well as leading revision sessions.
Services to Research Community	*April 2016* **Organiser of INTO-CPS WP2 Workshop in York** *September 2015* **Co-organiser for Software Engineering and Formal Methods Conference (SEFM) in York** *March 2010* **Co-organiser of Midlands Graduate School in Sheffield** *2005 and 2007* **Sheffield Theory Special Interest Group organiser** *2006* **Local co-organiser for International Workshop on Hypercomputation** (HyperTrends '06). **Paper reviews:** Formal Aspects of Computing, Theoretical Computer Science, ICFEM 2017, ITP 2017, RAMiCS 2011, "Software Testing, Verification and Reliability", SEEFM 2009, YR-SOC 2007
Notable Presentations	*"Foundations for Simulink diagrams in UTP"* – presentation at joint workshop with IIIT Bangalore and Mathworks in Bangalore, India, May 2017 *"Unifying Heterogeneous State-spaces with Lenses"* – guest seminar at University of Sheffield, February 2017 *"Towards Verification of Cyber-Physical Systems with UTP and Isabelle*" – guest seminar at University Paris-Sud, November 2016 *"Isabelle/HOL and UTP"* – tutorial associated with INTO-CPS in Aarhus, Denmark, September 2016 *"CyVeriPhy Project Proposal"* - internal group seminar on FET-Open proposal, Nov 2014. *"The COMPASS Modelling Language"* - tutorial at the COMPASS Interest Group meeting, Jan 2014. *"Isabelle/UTP: Mechanised Theory Engineering for Computer Scientists"* - internal group seminar at University of York, May 2013. *"Towards a theorem prover for CML"* - tutorial at COMPASS convergence workshop in Trieste, Mar 2013. *"CML tutorial"* - tutorial on COMPASS Modelling Language, Bremen, Feb 2013. *"Applying Agda in Model Driven Design"* - invited talk, McMaster University, Aug 2011.

	"Reflective Equational Proofs in Agda" - Agda meeting, 2011 at Chalmers University. *"A Compositional Semantic Theory for Service Composition"* - internal group seminar, 2009. *"Service Composition Algebra"* - Invited talk at Leicester University, Oct 2007. *"Behavioural Types for Service Composition"* - University of Bamberg. *"A Formal Model for Web Service Composition"* - British Colloquium for Theoretical Computer Science (BCTCS 2006), 04-2006 *"Implementation of a Timed Process Calculus in Haskell"* - internal group seminar, 2005
References	*Available on request*