

# CURRICULUM VITAE

## Mark Simon Tame

Associate Professor

School of Chemistry and Physics,  
University of KwaZulu-Natal,  
Durban 4001,  
South Africa

Office: +27 31-260-7794  
Cellular: +27-79-3931-904  
Web page: [www.quantumnanophotonics.org](http://www.quantumnanophotonics.org)

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## EDUCATION

- 2004-2007      Ph.D.  
School of Mathematics and Physics,  
Queen's University Belfast, UK.  
**Supervisor:** Prof. Myungshik Kim  
**Thesis:** *Measurement-based quantum information processing with imperfect operation*
- 2002-2003      M.Sc.  
Department of Physics,  
Durham University, UK.  
**Supervisor:** Dr Sacha Davidson  
**Thesis:** *Distinguishing Non-Standard Neutrino Interactions from Non-Unitarity*
- 1999-2002      B.Sc.  
Department of Physics,  
Imperial College London, UK.

## PROFESSIONAL EXPERIENCE

- 2013 - 2015**      **Associate Professor**  
School of Chemistry and Physics,  
University of KwaZulu-Natal, South Africa.  
**Teaching:** Undergraduate courses in electromagnetism, photonics and quantum mechanics.  
**Research:** Experimental research in quantum nanophotonics and quantum information.
- 2013**              **Post-doctoral researcher** (*Group of Prof. S. Maier*)  
(supported by Leverhulme Trust)  
Department of Physics,  
Imperial College London, UK.  
**Research:** Quantum optics and nanophotonics.
- 2010 - 2012**      **Research Fellow**  
(supported by EPSRC fellowship)  
Department of Physics,  
Imperial College London, UK.  
**Research:** Quantum optics, nanophotonics, multi-photon entanglement.  
**Teaching:** Postgraduate courses in advanced quantum information.

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**2007 - 2009**     **Post-doctoral researcher** (*Group of Prof. M. S. Kim*)  
(supported by *QIPIRC*)  
Department of Mathematics and Physics,  
Queen's University Belfast, UK.  
**Research:** Quantum optics and quantum information.

**2007**            **Research Fellow** (*Group of Prof. N. Imoto*)  
(supported by *JSPS fellowship*)  
Division of Materials Physics, Department of Materials Engineering Science,  
Graduate School of Engineering Science, Osaka University, Japan.  
**Research:** Quantum optics and quantum information.

## HONOURS AND AWARDS

- 2014/2015/2016, Specially Appointed Visiting Associate Professor, Osaka University, Japan.
- 2014, B3 Rating, from South African National Research Foundation.
- 2009, 3-year Postdoctoral Fellowship, from EPSRC.
- 2007, 3-month Postdoctoral Fellowship, from JSPS.
- 2007, QEP PhD Thesis Award (commended), from the Institute of Physics.
- 2006, Rank Prize Funds Award, Photon 06, from the Institute of Physics.
- 2006, Best Poster Prize Photon 06, from the Institute of Physics.

## RESEARCH GRANTS

- **Competitive Support for Rated Researchers:** Principal investigator  
*Funding Agency:* South African National Research Foundation  
*Period:* 2015  
*Budget:* 30,000 USD
- **National Laser Centre User Pool:** Principal investigator  
*Funding Agency:* South African Council for Scientific and Industrial Research  
*Period:* 2015  
*Budget:* 14,000 USD
- **Blue Skies Concept Notes:** Principal investigator  
*Funding Agency:* South African National Research Foundation  
*Period:* 2014-2015  
*Budget:* 14,000 USD
- **EPSRC Postdoctoral Fellowship:** Principal investigator  
*Funding Agency:* UK EPSRC  
*Period:* 2010-2012  
*Budget:* 325,000 USD
- **JSPS Postdoctoral Fellowship:** Principal investigator  
*Funding Agency:* JSPS  
*Period:* 2007  
*Budget:* 17,000 USD

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## PROFESSIONAL ACTIVITIES

### A. MEMBERSHIPS

- Institute of Physics UK, South African Institute of Physics
- South African National Institute for Theoretical Physics
- Optical Society of America

### B. REFEREEING

- Editorial Board Member for Journal of Optics (IOP)
- Nature Physics, Nature Photonics, Nature Materials, Nature Communications
- Physical Review Letters, Physical Review A, B and E
- Nano Letters, ACS Photonics
- Journal of the Optical Society of America, Optics Letters, Optics Express
- New Journal of Physics, Journal of Physics A: Math. Theor.
- European Journal of Physics D
- Optics Communications, Photonics and Nanostructures, Nanoparticle Research
- Plasmonics
- Proceedings of the Royal Society A

## NEWS and MEDIA COVERAGE

- A. Experimental realization of a one-way computer algorithm solving Simon's problem (*Phys. Rev. Lett.* 113, 200501, 2014)
- 'Historic quantum software is run for the first time', **New Scientist**, 23rd Oct (2014).
  - 'Milestone algorithm runs on quantum computer', **Science News**, 13th Dec (2014).
  - 'One-way quantum computer', **Nature Photonics**, 23rd Dec (2014).
  - 'Simon says speed up', **Physics**, 11th Nov (2014).
  - 'Algorithm runs faster on quantum computer', **Physics Today**, 24th Oct (2014).
  - 'Simon says quantum computing will work', **The Register**, 17th Nov (2014).
  - Front cover of **Phys. Rev. Lett.** 113, 20 (2014).
- B. Experimental realization of Deutsch's algorithm in a one-way quantum computer (*Phys. Rev. Lett.* 98, 140501, 2007)
- 'First use of Deutsch's algorithm in a cluster state quantum computer', **PhysOrg.com** (2007).
  - 'A quantum renaissance', **Physics World** (2008).
- C. 'Tricking the perfect code machine', interviewed by **BBC News** for article on website (2011).

## EXPERIENCE / SKILLS

### A. ADMINISTRATION

- Director of Physics Honours Programme, University of KwaZulu-Natal (2015).
- Library Representative for the School of Chemistry and Physics, University of KwaZulu-Natal (2015).
- Course Coordinator for Modern Physics for Life Sciences, University of KwaZulu-Natal (2014).
- Designed and maintained Imperial's quantum information online seminars website (2010-2013).

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## B. COMPUTING

- Microsoft Office, LaTeX, Adobe: Illustrator, Fireworks, Dreamweaver, Photoshop.
- Mathematica, Matlab, LabVIEW, COMSOL, Visual C++.
- Amazon EC2 Cloud Computing Platform.
- HTML, PHP.

## C. LANGUAGE

- English (Native)                      French, German, Spanish, Korean, Japanese (Basic)

## TEACHING

### A. UNDERGRADUATE

- Electromagnetism, 1st year B.Sc., 30 lectures, 2014/2015.
- Quantum mechanics, Honours year B.Sc., 24 lectures, 2014/2015.
- Photonics, 3rd year B.Sc., 30 lectures, 2015.
- Lab demonstration, 3rd year B.Sc., 42 contact hours, 2014/2015.

### B. POSTGRADUATE

- Advanced quantum information, M.Sc., 6 lectures, 2011/2012/2013

## STUDENT SUPERVISION and CO-SUPERVISION

- **Solomon Uriri:** Ph.D.  
*Role:* Supervisor  
*Topic:* Experimental quantum nanophotonics  
*Period:* 2015
- **Jason Francis:** M.Sc.  
*Role:* Supervisor  
*Topic:* Experimental quantum nanophotonics  
*Period:* 2015
- **Yannick Seis:** M.Sc. (*visiting student*)  
*Role:* Supervisor  
*Topic:* Experimental quantum optics  
*Period:* 2014-2015
- **Sanele Dlamini:** Ph.D.  
*Role:* Co-Supervisor  
*Topic:* Experimental quantum nanophotonics  
*Period:* 2014-2015
- **Kyle McEnery:** Ph.D.  
*Role:* Co-Supervisor  
*Topic:* Quantum metamaterials  
*Period:* 2011-2013
- **Daniel Ballester:** Ph.D.  
*Role:* Co-Supervisor  
*Topic:* Quantum plasmonics  
*Period:* 2007-2009

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- **Jean Maillard:** B.Sc.  
*Role:* Supervisor  
*Topic:* Quantum cryptography  
*Period:* 2012

## THESIS EXAMINER

- **Adriana Marais:** Ph.D.  
*Role:* Internal Examiner  
*Topic:* Quantum Effects in Photosynthesis  
*Year:* 2015
- **Shaun Burd:** MS.c.  
*Role:* Internal Examiner  
*Topic:* Towards quantum feedback of trapped ions using weak measurements  
*Year:* 2015

## INVITED AND CONTRIBUTED TALKS

### A. WINTER/SUMMER SCHOOL LECTURES

- Quantum plasmonics, 1 lecture - *Osaka University, Osaka, Japan, 2015.*
- Quantum nanophotonics, 2 lectures - *QIPC3, Drakensberg, South Africa, 2014.*
- Quantum plasmonics, 2 lectures - *Winter school on quantum information, Olomouc, Czech Rep., 2014.*

### B. INVITED CONFERENCE TALKS

- Optical resonances in quantum plasmonics, *PIERS, Prague, Czech Rep., 2015*
- Quantum nanophotonics, *QIPC3, Drakensberg, South Africa, 2014.*
- Quantized plasmons: waveguides, nanostructures and metamaterials, *OSA, Washington, USA, 2013.*

### C. CONTRIBUTED CONFERENCE TALKS (*selected*)

- Quantum statistics of surface plasmons on metallic stripe waveguides, *QCMC, Vienna, Austria, 2012.*
- Quantum plasmonics with metal nanoparticles, *EMRS, Strasbourg, France, 2012.*
- Quantum optical theory of surface plasmon polaritons, *Photon 10, Southampton, UK, 2010.*
- Experimental realization of many-photon symmetric states for multiparty quantum networking, *Photonics Workshop, University of Bristol, Bristol, UK, 2009.*
- Fault-tolerant one-way quantum computation using decoherence-free subspaces, *MBQC Conference, University of Oxford, Oxford, UK, 2007.*
- Natural three-qubit interactions in one-way quantum computing, *HP Labs, Bristol, UK, 2005.*

### D. INVITED SEMINARS (*selected*)

- Quantum nanophotonics, *University of the Witwatersrand, Johannesburg, South Africa, 2014.*
- Quantum plasmonics, *University of Southern California, Los Angeles, USA, 2013.*
- Quantum plasmonics, *NASA Ames Research Center, Moffett Field, Mountain View, USA, 2013.*
- Quantum plasmonics, *University of Washington, St. Louis, USA, 2013.*
- Quantum plasmonics, *University of Warsaw, Warsaw, Poland, 2013.*
- Quantum plasmonics, *University of Stuttgart, Stuttgart, Germany, 2011.*
- QIP with surface plasmon polaritons, *Hanyang University, Seoul, South Korea, 2008.*
- Measurement-based QIP with minimal resource graph states, *Osaka University, Osaka, Japan, 2007.*

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## PUBLICATIONS

- 35 Title: Distillation of photon entanglement using a plasmonic metamaterial  
Authors: M. Asano, M. Bechu, M. S. Tame, S. K. Ozdemir, R. Ikuta, D. O. Guney, T. Yamamoto, L. Yang, M. Wegener and N. Imoto  
Journal: Scientific Reports 5, 18313 (2015)  
DOI: [10.1038/srep18313](https://doi.org/10.1038/srep18313)
- 34 Title: Liquid quantum photonics  
Authors: M. S. Tame  
Journal: **Nature Photonics** 9, 485 (2015)  
DOI: [10.1038/nphoton.2015.130](https://doi.org/10.1038/nphoton.2015.130)
- 33 Title: Quantum plasmonic excitation in graphene and loss-insensitive propagation  
Authors: G. W. Hanson, S. A. Hassani Gangaraj, C. Lee, D. G. Angelakis and M. S. Tame  
Journal: Physical Review A 92, 013828 (2015)  
DOI: [10.1103/PhysRevA.92.013828](https://doi.org/10.1103/PhysRevA.92.013828)
- 32 Title: Quantum entanglement distillation with metamaterials  
Authors: Md. Abdullah al Farooqui, J. Breeland, M. I. Aslam, M. Sadatgol, S. K. Ozdemir, M. S. Tame, L. Yang and D. O. Guney  
Journal: Optics Express 23, 17941 (2015)  
DOI: [10.1364/OE.23.017941](https://doi.org/10.1364/OE.23.017941)
- 31 Title: Experimental demonstration of graph-state quantum secret sharing  
Authors: B. A. Bell, D. Markham, D. A. Herrera-Marti, A. Marin, W. J. Wadsworth, J. G. Rarity and M. S. Tame  
Journal: **Nature Communications** 5, 5480 (2014)  
DOI: [10.1038/ncomms6480](https://doi.org/10.1038/ncomms6480)
- 30 Title: Experimental Realization of a One-way Quantum Computer Algorithm Solving Simon's Problem  
Authors: M. S. Tame, B. A. Bell, C. Di Franco, W. J. Wadsworth and J. G. Rarity  
Journal: **Physical Review Letters** 113, 200501 (2014)  
DOI: [10.1103/PhysRevLett.113.200501](https://doi.org/10.1103/PhysRevLett.113.200501)
- 29 Title: Phonon-induced dynamic resonance energy transfer  
Authors: J. Lim, M. S. Tame, K. H. Yee, J.-S. Lee and J. Lee  
Journal: New Journal of Physics 16, 053018 (2014)  
DOI: [10.1088/1367-2630/16/5/053018](https://doi.org/10.1088/1367-2630/16/5/053018)
- 28 Title: Experimental demonstration of a graph state quantum error-correction code  
Authors: B. A. Bell, D. A. Herrera-Marti, M. S. Tame, D. Markham, W. J. Wadsworth and J. G. Rarity  
Journal: **Nature Communications** 5, 3658 (2014)  
DOI: [10.1038/ncomms4658](https://doi.org/10.1038/ncomms4658)
- 27 Title: Observation of Quantum Interference in the Plasmonic Hong-Ou-Mandel Effect  
Authors: G. Di Martino, Y. Sonnefraud, M. S. Tame, S. Kena-Cohen, F. Dieleman, S. K. Ozdemir, M. S. Kim and S. A. Maier  
Journal: Physical Review Applied 1, 034004 (2014)  
DOI: [10.1103/PhysRevApplied.1.034004](https://doi.org/10.1103/PhysRevApplied.1.034004)
- 26 Title: Fusing multiple W states simultaneously with a Fredkin gate  
Authors: F. Ozaydin, S. Bugu, C. Yesilyurt, A. A. Altintas, M. S. Tame and S. K. Ozdemir  
Journal: Physical Review A 89, 042311 (2014)  
DOI: [10.1103/PhysRevA.89.042311](https://doi.org/10.1103/PhysRevA.89.042311)

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- 25 Title: Universal gates for transforming multipartite entangled Dicke states  
Authors: T. Kobayashi, R. Ikuta, S. K. Ozdemir, M. S. Tame, T. Yamamoto, M. Koashi and N. Imoto  
Journal: New Journal of Physics 16, 023005 (2014)  
DOI: [10.1088/1367-2630/16/2/023005](https://doi.org/10.1088/1367-2630/16/2/023005)
  - 24 Title: Tunable negative permeability in a quantum plasmonic metamaterial  
Authors: K. R. McEnery, M. S. Tame, S. A. Maier and M. S. Kim  
Journal: Physical Review A 89, 013822 (2014)  
DOI: [10.1103/PhysRevA.89.013822](https://doi.org/10.1103/PhysRevA.89.013822)
  - 23 Title: Comment on ‘Energy transfer, entanglement and decoherence in a molecular dimer interacting with a phonon bath’  
Authors: J. Lim, M. S. Tame, K. H. Yee, J.-S. Lee and J. Lee  
Journal: New Journal of Physics 16, 018001 (2014)  
DOI: [10.1088/1367-2630/16/1/018001](https://doi.org/10.1088/1367-2630/16/1/018001)
  - 22 Title: Quantum plasmonics  
Authors: M. S. Tame, K. R. McEnery, S. K. Ozdemir, S. A. Maier and M. S. Kim  
Journal: **Nature Physics** 9, 329-340 (2013)  
DOI: [10.1038/NPHYS2615](https://doi.org/10.1038/NPHYS2615)
  - 21 Title: Experimental characterization of universal one-way quantum computing  
Authors: B. Bell, M. S. Tame, A. Clark, R. Noch, W. Wadsworth and J. Rarity  
Journal: New Journal of Physics 15, 53030 (2013)  
DOI: [10.1088/1367-2630/15/5/053030](https://doi.org/10.1088/1367-2630/15/5/053030)
  - 20 Title: Robust-to-loss entanglement generation using a quantum plasmonic nanoparticle array  
Authors: C. Lee, M. S. Tame, C. Noh, J. Lim, S. A. Maier, J. Lee and D. G. Angelakis  
Journal: New Journal of Physics 15, 83017 (2013)  
DOI: [10.1088/1367-2630/15/8/083017](https://doi.org/10.1088/1367-2630/15/8/083017)
  - 19 Title: Experimental characterization of photonic fusion using fiber sources  
Authors: B. Bell, A. Clark, M. S. Tame, M. Halder, J. Fulconis, W. Wadsworth and J. Rarity  
Journal: New Journal of Physics 14, 023021 (2012)  
DOI: [10.1088/1367-2630/14/2/023021](https://doi.org/10.1088/1367-2630/14/2/023021)
  - 18 Title: Quantum plasmonics with a metal nanoparticle array  
Authors: C. Lee, M. S. Tame, J. Lim and J. Lee  
Journal: Physical Review A 85, 063823 (2012)  
DOI: [10.1103/PhysRevA.85.063823](https://doi.org/10.1103/PhysRevA.85.063823)
  - 17 Title: Quantum Statistics of Surface Plasmon Polaritons in Metallic Stripe Waveguides  
Authors: G. Di Martino, Y. Sonnefraud, S. Kena-Cohen, M. S. Tame, S. K. Ozdemir, M. S. Kim and S. A. Maier  
Journal: **Nano Letters** 12, 2504 (2012)  
DOI: [10.1021/nl300671w](https://doi.org/10.1021/nl300671w)
  - 16 Title: Quantum theory of surface-plasmon polariton scattering  
Authors: D. Ballester, M. S. Tame and M. S. Kim  
Journal: Physical Review A 82, 012325 (2010)  
DOI: [10.1103/PhysRevA.82.012325](https://doi.org/10.1103/PhysRevA.82.012325)
  - 15 Title: Scalable method for demonstrating the Deutsch-Jozsa and Bernstein-Vazirani algorithms using cluster states  
Authors: M. S. Tame and M. S. Kim  
Journal: Physical Review A 82, 030305 (2010)  
DOI: [10.1103/PhysRevA.82.030305](https://doi.org/10.1103/PhysRevA.82.030305)

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- 14 Title: Characterizing multipartite symmetric Dicke states under the effects of noise  
Authors: S. Campbell, M. S. Tame and M. Paternostro  
Journal: New Journal of Physics 11, 073039 (2009)  
DOI: [10.1088/1367-2630/11/7/073039](https://doi.org/10.1088/1367-2630/11/7/073039)
  
  - 13 Title: Compact Toffoli gate using weighted graph states  
Authors: M. S. Tame, S. K. Ozdemir, M. Koashi, M. S. Kim and N. Imoto  
Journal: Physical Review A 79 020302 (2009)  
DOI: [10.1103/PhysRevA.79.020302](https://doi.org/10.1103/PhysRevA.79.020302)
  
  - 12 Title: Experimental Realization of Dicke States of up to Six Qubits for Multiparty Quantum Networking  
Authors: R. Prevedel, G. Cronenberg, M. S. Tame, M. Paternostro, P. Walther, M. S. Kim and A. Zeilinger  
Journal: **Physical Review Letters** 103, 020503 (2009)  
DOI: [10.1103/PhysRevLett.103.020503](https://doi.org/10.1103/PhysRevLett.103.020503)
  
  - 11 Title: Long-range surface-plasmon-polariton excitation at the quantum level  
Authors: D. Ballester, M. S. Tame, C. Lee, J. Lee and M. S. Kim  
Journal: Physical Review A 79, 053845 (2009)  
DOI: [10.1103/PhysRevA.79.053845](https://doi.org/10.1103/PhysRevA.79.053845)
  
  - 10 Title: Single-Photon Excitation of Surface Plasmon Polaritons  
Authors: M. S. Tame, C. Lee, J. Lee, D. Ballester, M. Paternostro, A. V. Zayats and M. S. Kim  
Journal: **Physical Review Letters** 101, 190504 (2008)  
DOI: [10.1103/PhysRevLett.101.190504](https://doi.org/10.1103/PhysRevLett.101.190504)
  
  - 9 Title: Experimental demonstration of decoherence-free one-way information transfer  
Authors: R. Prevedel, M. S. Tame, A. Stefanov, M. Paternostro, M. S. Kim and A. Zeilinger  
Journal: **Physical Review Letters** 99, 250503 (2007)  
DOI: [10.1103/PhysRevLett.99.250503](https://doi.org/10.1103/PhysRevLett.99.250503)
  
  - 8 Title: Experimental realization of Deutsch's algorithm in a one-way quantum computer  
Authors: M. S. Tame, R. Prevedel, M. Paternostro, P. Bohi, M. S. Kim and A. Zeilinger  
Journal: **Physical Review Letters** 98, 140501 (2007)  
DOI: [10.1103/PhysRevLett.98.140501](https://doi.org/10.1103/PhysRevLett.98.140501)
  
  - 7 Title: One-way quantum computing in a decoherence-free subspace  
Authors: M. S. Tame, M. Paternostro and M. S. Kim  
Journal: New Journal of Physics 9, 201 (2007)  
DOI: [10.1088/1367-2630/9/6/201](https://doi.org/10.1088/1367-2630/9/6/201)
  
  - 6 Title: An economical route to one-way quantum computation  
Authors: M. S. Tame, M. Paternostro, M. S. Kim and V. Vedral  
Journal: International Journal of Quantum Information 4, 689 (2006)  
DOI: [10.1142/S0219749906002092](https://doi.org/10.1142/S0219749906002092)
  
  - 5 Title: Decoherence-based exploration of d-dimensional one-way quantum computation: Information transfer and basic gates  
Authors: M. S. Tame, M. Paternostro, C. Hadley, S. Bose and M. S. Kim  
Journal: Physical Review A 74, 042330 (2006)  
DOI: [10.1103/PhysRevA.74.042330](https://doi.org/10.1103/PhysRevA.74.042330)
  
  - 4 Title: Entanglement generation and protection by detuning modulation  
Authors: M. Paternostro, M. S. Tame, G. M. Palma and M. S. Kim  
Journal: Physical Review A 74, 052317 (2006)  
DOI: [10.1103/PhysRevA.74.052317](https://doi.org/10.1103/PhysRevA.74.052317)



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- 3 Title: Natural three-qubit interactions in one-way quantum computing  
Authors: M. S. Tame, M. Paternostro, M. S. Kim and V. Vedral  
Journal: Physical Review A 73, 022309 (2006)  
DOI: 10.1103/PhysRevA.73.022309
  
  - 2 Title: Hybrid cluster state proposal for a quantum game  
Authors: M. Paternostro, M. S. Tame and M. S. Kim  
Journal: New Journal of Physics 7, 226 (2005)  
DOI: 10.1088/1367-2630/7/1/226
  
  - 1 Title: Quantum-information processing with noisy cluster states  
Authors: M. S. Tame, M. Paternostro, M. S. Kim and V. Vedral  
Journal: Physical Review A 72, 012319 (2005)  
DOI: 10.1103/PhysRevA.72.012319