Dr Tristan Friedrich KLEINSCHMIDT

NATIONALITY Australian

DATE OF BIRTH 30th of December 1983

CONTACT INFORMATION
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EDUCATION

Doctor of Philosophy (Elec Eng) *January 2006 – March 2010*

Queensland University of Technology, Brisbane, Australia

- Dissertation Title: *"Robust Speech Recognition using Speech Enhancement"*
- Principal Supervisor: Professor Sridha Sridharan
- Associate Supervisor: Dr Michael Mason
- Key Research Areas: Automotive Speech Recognition and Speech Enhancement

Graduate Certificate in Research Commercialisation *March 2008 – June 2008*

Queensland University of Technology, Brisbane, Australia

Master of Engineering Science (Computer & Communications) *February 2005 – January 2006*

Queensland University of Technology, Brisbane, Australia

Bachelor of Engineering (Electrical & Computer) with First Class Honours *February 2002 – July 2005*

Queensland University of Technology, Brisbane, Australia

PROFESSIONAL EXPERIENCE

Simulation Consultant (Full Time) *January 2012 – Current*

TSG Consulting, Perth, WA

The responsibilities of this position include:

- Ongoing validation of holistic mining supply chain simulation models for large mining client.
- Investigation of product mix in future mining operations and capacity planning.

Research Associate (Full Time) *January 2010 – January 2012*

Airports of the Future Project, Queensland University of Technology

The responsibilities of this position include:

- Simulation of passenger flows within airport passenger buildings for determining level of service.
- Supervision of PhD students and provision of operational guidance to other research staff.
- Active interaction, negotiation and liaison with all project industry partners, external investigators, and research facilities at both industry sites and the partnered universities.
- Ongoing project management including monitoring, evaluation of research milestones and project deliverables, as well as research and infrastructure support for the research team.
- Preparation of progress and project reports to industry partners, the Industry Advisory Committee and the Australian Research Council.
- Preparation of applications for national competitive funding sources including the Australian Research Council, National Security Science Technology Branch, and the Queensland Government.
- Public website administration and access control for internal project web services.
- Oral presentations for industry stakeholders to outline current project progress and advertise the project to the wider aviation community.

Sessional Academic *March 2003 – November 2011*

Faculty of Built Environment & Engineering, Queensland University of Technology

Main subject material taught:

- Software system design from problem analysis through to software development and testing.
- Programming in Matlab, C/C++.

Responsibilities undertaken during these positions:

- Development and delivery of lecture and tutorial material.
- Facilitation and grading of verbal and written examination.
- Continual evaluation of student feedback on all aspects of teaching; I have maintained a mean teaching rating of 4.35 out of 5 as evaluated by students.

PhD Candidate (Full Time) *January 2006 – March 2010*

Speech and Audio Research Laboratory, Queensland University of Technology

The research conducted during this candidature focussed on single-channel speech enhancement techniques specifically for automatic speech recognition applications. Particular areas of work included:

- Analysis and development of the use of phase spectrum information for spectral subtractive speech enhancement for automatic speech recognition.
- Implementation of likelihood-maximising frameworks for speech enhancement within speech dialogue systems for in-car speech recognition.
- Management of the collection and validation of an in-car speech database recorded by native Australian speakers in Australian driving conditions.
- All development work was conducted on a Linux cluster using a mixture of C++, Matlab, Perl, and Unix scripts.
- Attended professional development workshops and courses on topics such as research skills, public policy, research commercialisation, leadership and entrepreneurship.

Research Assistant (as required) *January 2006 – December 2009*

Speech and Audio Research Laboratory, Queensland University of Technology

This work was conducted as part of a joint project between General Motors Holden, LaTrobe University and QUT as part of the Co-operative Research Centre for Advanced Automotive Technology (AutoCRC). The responsibilities and particular work undertaken were:

- Demonstration to key stakeholders of proof-of-concept in-car speech system for navigation systems.
- Integration of spectral subtraction and delay-and-sum beamforming for in-car speech recognition.
- Validation testing of FPGA designs for single-channel spectral subtraction and dual-channel delay-and-sum beamforming.
- Development of spectral subtraction for simplified, low-resource implementation on an FPGA.
- Microphone and microphone location testing for for multi-channel in-car speech data collection.
- Compilation of work from full three year project into final project report.
- Preparation and submission of funding applications.

Visiting Research Scholar *April 2009 – July 2009*

Center for Robust Speech Systems, University of Texas at Dallas, TX, USA

This invited internship position was primarily for the assessment of speech dialogue systems for in-car speech applications. The work undertaken involved:

- Analysis of driver cognitive load when using in-car speech dialogue systems, including analysis of speech response delay against variables such as familiarity with English, and CAN-bus signals.
- Development of in-car speech data collection capturing changing noise conditions *during* driver's speech.
- Development of speech dialogue systems for in-car simulation data collection aimed at capturing various aspects of driver cognitive load during dialogue system interaction.

Honours and Awards

Australian Postgraduate Award Scholarship, 2006–2009.
Vice-Chancellors Postgraduate Scholarship, 2006–2009.
AutoCRC Postgraduate Scholarship, 2006–2009.
QUT University Medal, 2006.
ASSTA PhD Study Award, 2006.
Induction to Golden Key International Honour Society, 2003.
Dean's List of Students with Excellent Academic Record, 2002, 2003, 2004, 2005.

Current Memberships

IEEE, Full Member since 2009.
Australian Speech Science & Technology Association (ASSTA), since 2006.
Golden Key International Honour Society, since 2003.

Other Experience

Membership Coordinator – Built Environment & Engineering Dean's Scholars Alumni Group, 2006–2010.
Delegate to Robotics & Autonomous Systems Student Forum, 2005.

Computer Skills

- Languages: C/C++, Perl, UNIX scripting, Java, VBA, Siman.
- Applications: LaTeX, Matlab, ARENA, HTK, Microsoft Visual Studio, Office suite including Powerpoint, Excel and Access.
- Operating Systems: Windows and UNIX/Linux.

Tristan Friedrich KLEINSCHMIDT

PUBLICATIONS

Book Chapters:

1. **T. Kleinschmidt**, S. Sridharan and M. Mason, ""A Likelihood-Maximizing Framework for Enhanced In-Car Speech Recognition Based on Speech Dialog System Interaction," in *Digital Signal Processing for In-Vehicle Systems and Safety*, Springer Science+Business Media, LLC, 2012, pp. 159-174.

Journal Articles:

1. **T. Kleinschmidt**, S. Sridharan and M. Mason, "The Use of Phase in Complex Spectrum Subtraction for Robust Speech Recognition," *Computer Speech & Language*, vol. 25, 2011, pp. 585-600.

Conference Articles:

1. A. Harrison, V. Popovic, B. Kraal, **T. Kleinschmidt**, "Challenges in Passenger Terminal Design: A Conceptual Model of Passenger Experience," to be presented at the *Design Research Society Conference*, 2012.
2. S. Shuchi, R. Drogemuller, **T. Kleinschmidt**, "Flexible Airport Terminal Design: Towards a Framework", to be presented at the *IIE Asian Conference*, 2012.
3. **T. Kleinschmidt**, X. Guo, W. Ma, P.K.D.V. Yarlagadda, "Including Airport Duty-Free Shopping in Arriving Passenger Simulation and the Opportunities this Presents," presented at the *Winter Simulation Conference*, (Phoenix, AZ, USA), December 2011.
4. W. Ma, **T. Kleinschmidt**, C. Fookes, P.K.D.V. Yarlagadda, "Check-in Processing: Simulation of Passengers with Advanced Traits," presented at the *Winter Simulation Conference*, (Phoenix, AZ, USA), December 2011.
5. R. Navarathna, **T. Kleinschmidt**, D. Dean, S. Sridharan, P. Lucey, "Can Audio-Visual Speech Recognition outperform Acoustically Enhanced Speech Recognition in Automotive Environment?" to be presented at *INTERSPEECH*, (Florence, Italy), August 2011.
6. H. Bořil, O. Sadjadi, **T. Kleinschmidt** and J. H. L. Hansen, "Analysis and Detection of Cognitive Load and Frustration in Drivers' Speech," in *Proceedings of INTERSPEECH*, (Makuhari, Japan), pp. 502-505, 2010.
7. **T. Kleinschmidt**, S. Sridharan and M. Mason, "The Application of Phonetic Distribution Normalisation to Likelihood-Maximising Speech Enhancement for Robust ASR," in *Proceedings of the Speech Schience & Technology Conference*, (Melbourne, Australia), pp. 118-121, 2010.
8. **T. Kleinschmidt**, S. Sridharan and M. Mason, "The Effect of Dialect Mismatch on Likelihood-Maximising Speech Enhancement for Noise-Robust Speech Recognition," in *Proceedings of the Speech Schience & Technology Conference*, (Melbourne, Australia), pp. 114-117, 2010.
9. J. Whittington, H. Ye, K. Kamalakannan, N.V. Vu, M. Mason, **T. Kleinschmidt**, and S. Sridharan, "Low-Cost Hardware Speech Enhancement for Improved Speech Recognition in Automotive Environments", in *Proceedings of the 24th Australian Road Research Board Conference*, (Melbourne, Australia), pp. 1-17, 2010.
10. **T. Kleinschmidt**, M. Mason, E. Wong and S. Sridharan, "The Australian English speech corpus for in-car speech processing," in *Proceedings of the 34th IEEE International Conference on Acoustics, Speech and Signal Processing*, (Taipei, Taiwan), pp. 4177-4180, 2009.
11. **T. Kleinschmidt**, P. Boyraz, H. Bořil, S. Sridharan and J. H. L. Hansen, "Assessment of Speech Dialog Systems using Multi-Modal Cognitive Load Analysis and Driving Performance Metrics," in *Proceedings of the 5th IEEE International Conference on Vehicle Electronics and Safety*, (Pune, India), pp. 167-172, 2009.
12. H. Ye, J. Whittington, I. Himawan, **T. Kleinschmidt** and M. Mason, "FPGA implementation of dual-microphone delay-and-sum beamforming for in-car speech enhancement and recognition," in *Proceedings of the AutoCRC Conference*, (Melbourne, Australia), 2009.
13. J. Whittington, K. Deo, **T. Kleinschmidt** and M. Mason, "FPGA implementation of spectral subtraction for in-car speech enhancement and recognition," in *Proceedings of the 2nd International Conference on Signal Processing and Communication Systems*, (Gold Coast, Australia), 2008.
14. **T. Kleinschmidt**, D. Dean, S. Sridharan and M. Mason, "A continuous speech recognition protocol for the AVICAR database," in *Proceedings of the 1st International Conference on Signal Processing and Communication Systems*, (Gold Coast, Australia), pp. 339-344, 2007.
15. **T. Kleinschmidt**, S. Sridharan and M. Mason, "A modified LIMA framework for spectral subtraction applied to in-car speech recognition," in *Proceedings of the 1st International Conference on Signal Processing and Communication Systems*, (Gold Coast, Australia), pp. 335-338, 2007.

Invited Keynote Papers:

1. **T. Kleinschmidt**, A. Goonetilleke, C. Fookes, and P.K.D.V. Yarlagadda, "A Multi-Disciplinary Approach for the Design and Management of Airport Terminals", in *Proceedings of the All India Machine Tool Design and Research Conference*, (Andhra Pradesh, India), pp. 57-62, 2010.

Workshop Papers:

1. J. Whittington, K. Deo, **T. Kleinschmidt** and M. Mason, "FPGA implementation of spectral subtraction for automotive speech recognition," in *IEEE Workshop on Computational Intelligence in Vehicles and Vehicular Systems*, (Nashville, TN, USA), pp. 72-79, 2009.
2. **T. Kleinschmidt**, S. Sridharan and M. Mason, "Likelihood-maximising frameworks for enhanced in-car speech recognition," in *4th Biennial Workshop on DSP for In-Vehicle Systems and Safety*, (Dallas, TX, USA), 2009.

Conference Presentations

- Winter Simulation Conference, Phoenix, AZ, USA, December 2011 (2 papers).
- HCSNet SummerFest, Sydney, Australia, December 2009.
- 4th Biennial Workshop on DSP for In-Vehicle Systems and Safety, Dallas, TX, USA, June 2009.
- 34th IEEE International Conference on Acoustics, Speech, and Signal Processing, Taipei, Taiwan, April 2009 (2 papers).
- 1st International Conference on Signal Processing and Communication Systems, Gold Coast, Australia, December 2007 (2 papers).