

**Stephen T.  
Nuske**  
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**PERSONAL**

**Place of Birth:** Brisbane, Australia  
**Citizenship:** Dual: Australian/British  
**Residency:** United States

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**RESEARCH  
INTERESTS**

Field robotics, agricultural robotics, computer vision, visual localization, visual geometry, visual tracking, visual segmentation.

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**EMPLOYMENT**

**Systems Scientist, Robotics Institute, Carnegie Mellon Univ., USA**  
*July 2015 - present*

- Researching computer vision systems for field robotics applications
- Principal Investigator on research projects
- Supervising Postdoc Fellows, Research Engineers, Graduate students

**Consultant, Patton Nuske LLC, PA, USA**

- Independent consulting services for wide array of topics relating to robotics and computer vision systems

**Senior Project Scientist, Carnegie Mellon Univ., USA**  
*February 2013 – June 2015*

**Project Scientist, Robotics Institute, Carnegie Mellon Univ., USA**  
*November, 2010 – January, 2012*

**Postdoctoral Fellow, Robotics Institute, Carnegie Mellon Univ., USA**  
*November 2008 - November, 2010*

**Visiting Researcher, INRIA, Grenoble, France**  
*November 2005 – February 2006*

**Software Engineer Intern, BSD Robotics, Australia**  
*June 2004 – February 2005*

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**EDUCATION**

**PhD, Univ. of Queensland & CSIRO, Australia**  
*2005-2009*

Thesis: [Visual Localisation in Dynamic Non-uniform Lighting](#)  
Thesis Advisor: Gordon Wyeth and Jonathan Roberts

**Cognitive Vision Summer School, Universität Bonn, Germany**  
*August 2005*

**Bachelor of Software Engineering, Univ. of Queensland, Australia**  
*2001-2005*

**Secondary Education, Burnside State High School, Australia**  
*2000*

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**PUBLICATION LIST**  
(Selected list, see [stephennuske.com](http://stephennuske.com) for full list)

Stephen Nuske, Sanjiban Choudhury, Sezal Jain, Andrew Chambers, Luke Yoder, Sebastian Scherer, Lyle Chamberlain, Hugh Cover, and Sanjiv Singh. [Autonomous exploration and motion planning for a uav navigating rivers](#). *Journal of Field Robotics*, June 2015.

Stephen Nuske, Kyle Wilshusen, Supreeth Achar, Luke Yoder, Srinivasa Narasimhan, and Sanjiv Singh. [Automated visual yield estimation in vineyards](#). *Journal of Field Robotics*, 31(5):837--860, September 2014.

Sezal Jain, Stephen Nuske, Andrew Chambers, Luke Yoder, Hugh Cover, Lyle Chamberlain, Sebastian Scherer, and Sanjiv Singh. [Autonomous river exploration](#). In *Proceedings of International Conference on Field and Service Robotics*, December 2013. **\*\*Won best paper award\*\***

Q. Wang, S. Nuske, M. Bergerman, and S. Singh. [Automated crop yield estimation for apple orchards](#). In *Proceedings of International Symposium of Experimental Robotics*, June 2012.

S. Achar, B. Sankaran, S. Nuske, S. Scherer, and S. Singh. [Self-supervised segmentation of river scenes](#). In *IEEE International Conference on Robotics and Automation*, May 2011.

S. Nuske, M. Dille, B. Grocholsky, and S. Singh. [Representing substantial heading uncertainty for accurate geolocation by small uavs](#). In *American Institute of Aeronautics and Astronautics (AIAA) Guidance, Navigation, and Control Conference*, August 2010.

Stephen Nuske, Jonathan Roberts, and Gordon Wyeth. [Robust outdoor visual localization using a three-dimensional-edge map](#). *Journal of Field Robotics*, 26:728--756, September 2009.

S. Nuske, J. Roberts, D. Prasser, and G. Wyeth. [Experiments in visual localisation around underwater structures](#). In *Proceedings of International Conference on Field and Service Robotics*, July 2009.

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**RESEARCH FUNDING**  
(Participating as Principal Investigator (PI) or Co-PI)

**2016- USDA – Specialty Crop Research Initiative – Collecting and Interpreting Spatial Data for Variable Vineyard Management**

**: \$USD 1,877,941 - 4 years**  
Principal Investigator from Carnegie Mellon developing methods to automatically measure vineyard characteristics (USDA Award No 2015-51181-24393)

**2016- USDA – National Robotics Initiative – Robotic Harvest-Aiding Orchard Platforms : \$USD 408,000 - 3 years**

Principal Investigator from Carnegie Mellon developing methods to automatically measure fruit density for automating harvest platforms (USDA Award No 2016-67021-24535)

**2016- Dept. of Energy – TERRA Program – Breeding High Yielding Bioenergy Sorghum for the New Bioenergy Belt : \$USD 2,500,000 - 4 years**

Co-Principal Investigator from Carnegie Mellon University (w/ George Kantor) developing high throughput phenotyping robotic systems with Clemson University team (ARPA-e Award No. 1830-219-2020937)

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**2014-2015 Office of Naval Research – AACUS Program – Fundamental Research in Visual Landmarks-Assisted Autonomous Flight: \$USD**

**200,000 - 1 year**

Principal Investigator from Carnegie Mellon University studying computer vision systems to detect landing sites from autonomous helicopter (US Gov. Prime Award No. N00014-12-C-0671)

**2012-2015 National Robotics Initiative - United States Department of Agriculture - Active Sampling in Agriculture by Teams of Humans and Robots: \$USD 890,000 - 3 years**

Principal Investigator directing team from Carnegie Mellon University studying science behind collection of crop information in agriculture. (NIFA/USDA grant no. 2012-67021-19958)

**2014-2016 Office of Naval Research – Micro Air Vehicle Scouts for Intelligent Semantic Mapping: \$USD 750,000 – 3 years**

Co-PI on program lead by PI Sebastian Scherer. My responsibility is helping long-range vision-based perception for exploration behaviors.

**2010-2014 National Grape and Wine Initiative - Automated Crop and Canopy Estimation: \$USD 480,000 - 4 years**

Worked as Principal Investigator for Carnegie Mellon University funded directly by U.S. grape and wine industry group. Project looking at image-based estimation of grape yield and quality.

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**RESEARCH  
FUNDING**

*(Participating as  
researcher)*

**2011-2012 National Institute of Food and Agriculture / Specialty Crop Research Initiative – Comprehensive Automation for Specialty Crops – Crop Yield Estimation**

Worked as Project Scientist on the crop yield estimation theme as part of Carnegie Mellon University team lead by Prof. Sanjiv Singh. My role was to lead the development of an image-based yield estimation system.

**2010-2013 US Office of Naval Research – River Mapping with a Low-Flying Unmanned Aerial System**

Worked as Project Scientist for Carnegie Mellon University team lead by Prof. Sanjiv Singh funded by the US Office of Naval Research. My responsibility was to lead the development of an image-based river segmentation algorithm and a river exploration algorithm.

**2010 Small Business Innovation Research Grant – ONR – Object Proximity Warning System for Vertical Replenishment by Helicopters on Shipdecks**

Worked as Postdoctoral Fellow as part of Carnegie Mellon University team lead by Prof. Sanjiv Singh subcontracting to Piasecki Aircraft Corp. My responsibility was to lead the development of an image-based tracking and pose estimation algorithm using the landing markings on the shipdeck.

**2008-2010 Small Business Innovation Research Grant – US Army AARDEC– Air-Ground Collaboration**

Worked as Postdoctoral Fellow as part of Carnegie Mellon University team lead by Prof. Sanjiv Singh subcontracted to iRobot Corporation. My responsibility was to develop a geolocating and visual tracking

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algorithms from the UAV camera stream.

**2009-2010 DARPA – ULTRA-VIS Program -- Situational Awareness**  
Worked as Postdoctoral Fellow as part of Carnegie Mellon University team lead by Prof. Sanjiv Singh subcontracted to Lockheed Martin Corporation. My responsibility was to develop a wide baseline stereo estimation system.

**2005-2008 PhD Scholarship – Visual Localisation in Dynamic Non-uniform Lighting**

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**SCHOLARLY  
ACTIVITIES**

**Associate Editor**

- Robotics and Automation – Letters 2015-
- International Conference on Robotics and Automation 2015-

**Program Committee**

- Robotics: Science and Systems Conference, 2012

**Session Chair**

- International Symposium on Experimental Robotics 2013
- Field and Service Robotics Conference 2015

**Panel/Proposal Reviewer**

- National Science Foundation
- Ministry of Business, Innovation & Employment, New Zealand.
- BARD, the United States - Israel Bi-national Agricultural Research Fund

**Thesis Committee**

- Justin Haines, Masters, Speaking Qualifier Committee, Robotics Institute, Carnegie Mellon University, 2012
- Daniel Maturana, Speaking Qualifier Committee, PhD, Robotics Institute, Carnegie Mellon University, 2013

**Carnegie Mellon Service Activities**

- Robotics Institute Seminar Chair, Nov 2015-
- Field Robotics Center, Seminar Coordinator, 2011-2012

**Journal Reviewer**

- Journal of Field Robotics
- Journal of Machine Vision and Applications
- Autonomous Robots

**Academic supervision:**

**Volker Grabe, Post Doctoral Researcher, Carnegie Mellon University**  
*April 2015 – Current*

**Yu Song, Post Doctoral Researcher, Carnegie Mellon University**  
*November 2014 – Current*

**Omeed Mirbod, Research Engineer, Carnegie Mellon University**  
*October 2015 – Current*

**Zania Pothen, Masters Robotics Systems Design / Research Engineer, Carnegie Mellon University**  
*July 2013 – Current*

**Luke Yoder, Masters / Robotics Engineer, Carnegie Mellon University**  
*January 2013 - Current*

**Qi Wang, Postdoctoral Fellow, Carnegie Mellon University**  
*Sept 2011 - August 2012*

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**Kyle Wilshusen, Research Associate, Carnegie Mellon University**

*June 2012 – August 2014*

**Sezal Jain, Research Associate, Carnegie Mellon University**

*April 2012 – present*

**Kamal Gupta, Masters, IIT Dehli, India**

*June 2011 - June 2012*

**Supreeth Achar, Masters, Carnegie Mellon University, USA**

*December 2009 - December 2010*

**Ashley Stanley, Student Intern, CSIRO Autonomous Systems Lab, Australia**

*December 2006 - February 2007*

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**PRESS  
COVERAGE**

- [USA Today Special Issue on U.S. Department of Agriculture, June 2014, "Sensors, Drones and Big Data", Erik Schechter.](#)
  - [New Scientist, June 2013, "Mechanical eye will help wine-makers improve vintages", by Sara Reardon](#)
  - Fruit Grower News, March 2013, "New robotic technology estimates crop yield", Derek Sigler
  - [Robotics Business Review, March 2013, "Will Robots Make Farm Work a 24/7 Business?"](#)
  - [Good Fruit Grower, November 2012, "Automated Crop Estimation"](#)
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