

**Stephen T.
Nuske**
stephennuske.com

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PERSONAL

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

**RESEARCH
INTERESTS**

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

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

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

PUBLICATION LIST
(Selected list, see 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.

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)

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.

**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

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

**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 Pothan, 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

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

**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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