

# Radu B. Rusu



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## Objective

I believe that we are on the verge of a new revolution. As personal computers have fundamentally changed our society in the last century, a new generation of technical devices are almost ready to help enrich our working environments and improve our quality of life. The idea of a personal robot is not new, but with recent progress in other industries, things are converging faster than ever.

The goal of my work is to drive the pace of innovation and convergence of robotic technologies forward to enrich the quality of our work and personal lives. I have been working with many different robotic systems in my career, and have contributed to some of the most important research and open source initiatives in the community. My research contributions have helped a few generations of researchers, and the software that I wrote has enabled many robotic systems to perform things more efficiently and robustly. In a leadership and managerial capacity, I have supervised a lot of researchers, mentored dozens of interns, and created and led communities of many hundreds of developers, including researchers and engineers from all around the world.

I am currently expanding on the success of my own work, as well as the work of my fellow researchers, and working towards solving important problems in robotics that include image and point cloud processing, semantic mapping, machine learning, and distributed computing.

## Summary

- “Individuals with Extraordinary Ability or Achievement” O-1 US visa recipient.
- IEEE Robotics and Automation Society “Early Career Award” 2013 for identifiable contributions which have had a major impact on the robotics industry (creating and leading an open source ecosystem that fosters technology transfer in 3D perception between academia and industry).
- Founder and Maintainer of the largest open source initiative for 3D point cloud processing: the Point Cloud Library (PCL) project. Currently managing a community of over 500 developers and many thousands of users, for a consortium of more than 15 commercial companies and over 50 research institutes worldwide.
- Core R&D team member at Willow Garage for the Robot Operating System and Point Cloud Library projects.
- Research career: over 40 invited/research talks at prestigious institutions and conferences in the robotics and vision fields; co/organizer of > 20 major scientific events, including workshops, doctoral schools, and general chair for ARSO 2011 conference; reviewer for > 30 different journals, conferences, and workshops; published > 70 peer reviewed papers, including 2 books.
- Many different contributions to over 20 open source projects.
- Summa cum laude awards for BSc, MSc and PhD degrees, as well as 3 other publication awards and nominations.
- Supervised over 35 internship projects and theses.

## Experience

### **President and Chief Executive Officer, Open Perception Inc.**

Menlo Park, CA — April 2012-current

Managing an organization for the PCL (Point Cloud Library) project, with over 500 developers, many thousands of users, and financial support from over 15 commercial companies and institutes.

### **Visiting Lecturer, Stanford University**

Palo Alto, CA — March 2010-current

Teaching “*Perception for Manipulation*” (CS324) at Stanford University for both undergraduate and graduate students. The class focuses on advanced 2D and 3D perception using a variety of sensors, and their uses for autonomous personal robotics applications. Supervising and grading student projects as part of the class.

### **Research Scientist, Willow Garage Inc.**

Menlo Park, CA — October 2009-April 2012

Research on 3D perception and different areas of robotics, core member of the ROS (Robot Operating System) project, team leader on the PCL (Point Cloud Library) project.

### **Visiting Researcher, Willow Garage Inc.**

Menlo Park, CA — October 2008-January 2009

Participated as core team member to the development of the Robot Operating System (ROS). Created the entire 3D point cloud perception pipeline that still being used on PR2 research projects and demonstrations around the world. Contributions to the PR2 hardware as well as many other projects.

### **International Fellow Researcher, Stanford Research Institute (SRI)**

Menlo Park, CA — October 2007-February 2008

Research on 3D perception and semantic mapping, working on the Leaving Flatland DARPA project, together with Stanford University and Boston Dynamics. Led the perception team.

### **CoTeSys excellence cluster Scientific Researcher, Intelligent Autonomous Systems at Technische Universität München (TUM)**

Munich, Germany — August 2005-October 2009

Research on 3D perception, different areas of artificial intelligence and robotics, under the supervision of Prof. Michael Beetz, PhD. Supervised > 15 master and junior PhD students, and taught two separate seminars on “*Sensor-enabled Intelligent Environments*” and “*Intelligent Systems*.” Published over 35 scientific papers in prestigious journals and conferences in the field of robotics, and helped organize several scientific events.

### **Researcher, Robotics Research Group at Technical University of Cluj Napoca (TUCN)**

Cluj-Napoca, Romania — September 2004-June 2005

Building the ZeeRO mobile robot, research on different areas of robotics, supervising student diploma theses, Robotux portal owner and maintainer, code contributor for the Player/Stage project. Taught two seminars on “*Data Transmissions*” and “*FreeBSD/Win32 assembler language for Peripheral Devices*”.

## Education

### Technische Universität München (TUM)

PhD (Dr. Rer. Nat) in Computer Science — September 2005-October 2009

Thesis: “*Semantic 3D Object Maps for Everyday Manipulation in Human Living Environments*”, **summa cum laude**

- Advisor: Prof. Michael Beetz, PhD
- Thesis committee: Prof. Kurt Konolige (Stanford University), Prof. Gary Bradski (Stanford University), Prof. Nassir Navab (TUM)

### Doctoral schools/colloquiums

2005-2009

- “*Cognition, Control, and Learning for Robot Manipulation in Human Environments*”, Dagstuhl seminar, Schloss Dagstuhl, Germany, August 2009
- “*Theory and Applications of Laser Scanning*”, 2<sup>nd</sup> ISPRS summer school at University of Ljubljana, Slovenia, June 2007
- “*SSS: SLAM Summer School 3<sup>rd</sup> edition*”, Oxford University, UK, August 2006
- “*RobotCub Summer School: Veni Vidi Vici*”, LIRA-lab at University of Genova, Italy, August 2006
- “*First International Doctoral Colloquium on Pervasive Computing*”, Institute for Pervasive Computing of the Johannes Kepler University Linz, Austria, March 2006
- “*Rescue Robotics Camp*” summer school at University of La Sapienza, Italy, November 2005

### Technical University of Cluj-Napoca

Postgraduate studies — 2004-2005

Postgraduate studies (Advanced Masters dissertation thesis) as part of the Faculty of Automation and Computer Science, Automation and Industrial department.

Thesis: “*Modern architectures for mobile robots: Javaclient and ZeeRO*”, 10/10

- Advisor: Prof. Dr. Ing. Gheorghe Lazea (president of the university)

### Technical University of Cluj-Napoca

Dipl. Ing. (MSc in engineering) — 1999-2004

MSc in engineering (Masters dissertation thesis) as part of the Faculty of Automation and Computer Science, Automation and Industrial department.

Thesis: “*Robotux, a multiagent robot security system*”, 10/10

- Advisors: Prof. Dr. Ing. Liviu Miclea (head of the department) and Prof. Dr. Ing. Gheorghe Lazea (president of the university)

## Research Grants / Awards

**2013**

- IEEE Robotics and Automation Society “Early Career Award” 2013 for identifiable contributions which have had a major impact on the robotics in the industry.

**2011**

- Recipient of **First prize (“grand prize”)** at the International Open Source Software (OSS) World Challenge 2011 challenge competition for Point Cloud Library (PCL) project
- **Finalist** (2nd prize) for best PhD thesis in robotics at EURON George Giralto PhD Award
- **Best Paper student Award finalist** for “*Bingham Mixture Models of Quaternions for Object Orientation Estimation*” at Robotics Science and Systems (RSS), Los Angeles, CA, USA, 2011.

## 2009

- **Best Paper Award** for “*Laser-based Perception for Door and Handle Identification*” at International Conference on Advanced Robotics (ICAR), Munich, Germany, 2009.
- Recipient of Willow Garage research grant for “*3D Semantic Mapping for Indoor Environments*”.

## 2008

- Recipient of CoP DFG research grant for “*Cognitive Perception for Everyday Manipulation Activities in Human Environments*”, CoTeSys cluster of excellence project P140, Area F.

## 2007

- Recipient of BACATEC research grant for “*Dynamic 3D object maps for autonomous mobile robots*”. Visiting Researcher at the Stanford Research Institute (SRI International) from Aug 2007 until Jan 2008.

## 2004

- Recipient of AGENTEL research grant for “*Multiagent societies in supervising hydro-electrical power plant chains*”, Technical University of Cluj-Napoca.

## Professional Activities

### Organizer

1. *Organizing chair for IEEE Workshop on Robot Vision (WoRV) 2013*, January 16-17, 2013, Clearwater Beach, Florida
2. *Co-organizer of the “Active Semantic Perception (ASP’12), Context and Semantic Prior in Active Perception” workshop*, held in conjunction with IROS (Intelligent Robots and Systems) 2012, October 7-12, 2012, Algarve, Portugal
3. *Workshop and tutorial chair for IROS (Intelligent Robots and Systems) 2012*, October 7-12, 2012, Algarve, Portugal
4. *Co-organizer of the “Advanced 3D Image Processing” tutorial*, held in conjunction with Computer Vision and Pattern Recognition (CVPR), June 16, 2012, Providence, RI, USA
5. *Co-organizer of the “Advanced 3D Point Cloud Processing” tutorial*, held in conjunction with ICRA (International Conference on Robotics and Automation), May 18, 2012, St. Paul, Minnesota
6. *Co-organizer of the “3D Point Cloud Processing” tutorial*, held in conjunction with the Ninth Conference on Computer and Robot Vision (CRV), May 27, 2012, Toronto, Ontario, Canada
7. *Co-organizer of the “2nd Semantic Perception, Mapping and Exploration (SPME)” workshop*, held in conjunction with ICRA (International Conference on Robotics and Automation), May 14, 2012, St. Paul, Minnesota
8. *General chair of the ARSO (Advanced Robotics and its Social Impacts) conference*, 2-4 October 2011, Half-Moon Bay, CA
9. *Co-organizer of the “3D Point Cloud Processing: PCL (Point Cloud Library)” tutorial*, held in conjunction with ICCV (International Conference on Computer Vision), December 2011, Barcelona, CA
10. *Co-organizer of the “3D Point Cloud Processing: PCL (Point Cloud Library)” tutorial*, held in conjunction with IROS (Intelligent Robots and Systems), September 25, 2011, San Francisco, CA
11. *Co-organizer of the “3D Point Cloud Processing: PCL (Point Cloud Library)” tutorial*, held in conjunction with RSS (Robotics Science and Systems), July 1, 2011, Los Angeles, CA
12. *Co-organizer of the “Mobile Manipulation: Learning to Manipulate” workshop*, held in conjunction with RSS (Robotics Science and Systems), June 27, 2011, Los Angeles, CA

13. Co-organizer of the “*Semantic Perception, Mapping and Exploration (SPME)*” workshop, held in conjunction with ICRA (International Conference on Robotics and Automation), May 9, 2011, Shanghai, China
14. Co-organizer of the “*CoTeSys-ROS Fall School on Cognition-Enabled Mobile Manipulation*” tutorial, November 1-6, 2010, Munich, Germany
15. Co-organizer of the “*Computer Vision and 3D Perception for Robotics*” tutorial, held in conjunction with ECCV-10, European Conference on Computer Vision, September 5, 2010, Crete, Greece
16. Co-organizer of the “*Realistic Perception Problems and their Solutions for Personal Robotics*” workshop, held in conjunction with IROS-10, International Conference on Intelligent Robots and Systems, 2010, Taipei, Taiwan
17. Co-organizer of the “*Semantic Mapping and Autonomous Knowledge Acquisition*” workshop, held in conjunction with IROS-10, International Conference on Intelligent Robots and Systems, 2010, Taipei, Taiwan
18. Co-organizer of the “*Strategies and Evaluation for Mobile Manipulation in Household Environments*” workshop, held in conjunction with RSS-10, Robotics Science and Systems, Sunday, June 27, 2010, Zaragoza, Spain
19. Co-organizer of the “*Best Practice in 3D Perception and Modeling for Mobile Manipulation*” workshop, held in conjunction with ICRA-10, IEEE International Conference on Robotics and Automation (ICRA2010), May 3, 2010, Anchorage, Alaska
20. Co-organizer of the “*IJCAI-09 Mobile Manipulation Challenge*”, held in conjunction with IJCAI-09, the Twenty-first International Joint Conference on Artificial Intelligence, July 11-17, 2009, Pasadena, California
21. Co-organizer of the “*IROS-09 Workshop on Semantic Perception for Mobile Manipulation*”, held in conjunction with IROS-09, the International Conference on Intelligent Robots and Systems, October 11-15, 2009, St. Louis, MO
22. Co-organizer of the “*3rd Workshop on Planning and Plan Execution for Real-World Systems*”, Principles and Practices for Planning in Execution, held in conjunction with ICAPS'07: 17th International Conference on Automated Planning & Scheduling, September 22-26th, 2007, Providence, Rhode Island
23. Co-organizer of the “*Player Summer School on Cognitive Robotics*”, hosted in Munich, 13-20 August, 2007
24. Co-organizer of the “*The Fifth International Cognitive Robotics Workshop (The AAI-06 Workshop on Cognitive Robotics)*”, held in conjunction with AAI-06, the Twenty-First National Conference on Artificial Intelligence, July 16-20, 2006, Boston, Massachusetts

**Program committee member:** over 10 scientific events (list available on request)

**Reviewer:** over 20 different journals and conferences (list available on request)

**Memberships:**

1. Institute of Electrical and Electronic Engineers (IEEE) - Senior Member
2. IEEE Robotics and Automation Society (RAS) - Senior Member
3. Open Natural Interfaces (OpenNI) – Advisory Board
4. IEEE RAS Technical Committee on “*Computer & Robot Vision*” - Committee Chair
5. IEEE RAS Technical Committee on “*Service Robotics*” - Committee Chair

**Books / Book chapters:**

1. **R. B. Rusu.** “*Semantic 3D Object Maps for Everyday Manipulation in Human Living Environments*”, Springer, in press.
2. **R. B. Rusu, H. Voleon.** “*Peripheral Devices assembler programming guide for FreeBSD / Win32*” book, U.T.Pres, 2005, ISBN 973-662-174-X.

Publications

### Journals:

1. A. Aldoma, Z.C. Marton, F. Tombari, W. Wohlkinger, C. Potthast, B. Zeisl, **R.B. Rusu**, M. Dixon, S. Gedikli. "PCL - Point Cloud Library. Survey of 3D Shape Features for Object Recognition and 6DOF Pose Estimation". IEEE Robotics & Automation Magazine journal, 2012.
2. G. Biggs, **R.B. Rusu**, T. Collett, B. Gerkey, R. Vaughan. "And all the robots merely Players". IEEE Robotics & Automation Magazine journal, 2012.
3. **R.B. Rusu**. "Semantic 3D Object Maps for Everyday Manipulation in Human Living Environments". Artificial Intelligence (KI - Künstliche Intelligenz) journal, 2010. Invited paper.
4. **R.B. Rusu**, J. Bandouch, F. Meier, I. Essa, M. Beetz. "Human Action Recognition using Global Point Feature Histograms and Action Shapes". Advanced Robotics journal, Robotics Society of Japan (RSJ), 2009.
5. **R.B. Rusu**, A. Sundaresan, B. Morisset, K. Hauser, M. Agrawal, J.C. Latombe, M. Beetz. "Leaving Flatland: Efficient Real-Time 3D Perception and Motion Planning". Journal of Field Robotics, 2009.
6. **R.B. Rusu**, Z. C. Marton, N. Blodow, M. Dolha, M. Beetz. "Towards 3D Point Cloud Based Object Maps for Household Environments". Robotics and Autonomous Systems Journal (Special Issue on Semantic Knowledge), 2008.
7. **R. B. Rusu**, B. Gerkey, M. Beetz. "Robots in the kitchen: Exploiting ubiquitous sensing and actuation". Robotics and Autonomous Systems Journal (Special Issue on Network Robot Systems), 2008.

### Refereed Conferences:

1. S. Holzer, **R.B. Rusu**, M. Dixon, S. Gedikli, N. Navab. *Real-Time Surface Normal Estimation from Organized Point Cloud Data Using Integral Images*. Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2012.
2. A. Aldoma, F. Tombari, **R.B. Rusu**, M. Vincze. *OUR-CVFH Oriented, Unique and Repeatable Clustered Viewpoint Feature Histogram for Object Recognition and 6DOF Pose Estimation*. Proceedings of DAGM-OAGM 2012.
3. T. Kröger, K. Oslund, T. Jenkins, D. Torczynski, N. Hippenmeyer, **R.B. Rusu**, O. Khatib. *JediBot - Experiments in Human-Robot Sword-Fighting*. In Proceedings of the International Symposium on Experimental Robotics, Quebec City, Canada, June 2012.
4. W. Wohlkinger, A. Aldoma, **R.B. Rusu**, M. Vincze. *3DNet: Large-Scale Object Class Recognition from CAD Models*. Proceedings of the IEEE International Conference on Robotics and Automation (ICRA), 2012.
5. J. Kammerl, N. Blodow, **R.B. Rusu**, S. Gedikli, M. Beetz, E. Steinbach. *Real-time Compression of Point Cloud Streams*. Proceedings of the IEEE International Conference on Robotics and Automation (ICRA), 2012.
6. K. Wurm, D. Hennes, D. Holz, **R.B. Rusu**, C. Stachniss, K. Konolige, W. Burgard. *Hierarchies of Octrees for Efficient 3D Mapping*. Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2011.
7. D. Holz, S. Holzer, **R.B. Rusu**, S. Behnke. *Real-Time Plane Segmentation using RGB-D Cameras*. Proceedings of the RoboCup Symposium, 2011.
8. J. Glover, G. Bradski, **R.B. Rusu**. *Bingham Mixture Models of Quaternions for Object Orientation Estimation*. Proceedings of Robotics Science and Systems (RSS), 2011, Los Angeles, CA, USA.
9. **R.B. Rusu**, S. Cousins. *3D is here: Point Cloud Library (PCL)*. Proceedings of the IEEE International Conference on Robotics and Automation (ICRA), 2011.
10. B. Steder, **R.B. Rusu**, K. Konolige, W. Burgard. *Point Feature Extraction on 3D Range Scans Taking into Account Object Boundaries*. Proceedings of the IEEE

- International Conference on Robotics and Automation (ICRA), 2011.
11. M.C. Muja, **R.B. Rusu**, G. Bradski, D. Lowe. *REIN - A Fast, Robust, Scalable REcognition Infrastructure*. Proceedings of the IEEE International Conference on Robotics and Automation (ICRA), 2011.
  12. J. Bohren, **R.B. Rusu**, E.G. Jones, E. Marder-Eppstein, C. Pantofaru, M. Wise, L. Möesenlechner, W. Meeussen, S. Holzer. *Towards Autonomous Robotic Butlers: Lessons Learned with the PR2*. Proceedings of the IEEE International Conference on Robotics and Automation (ICRA), 2011.
  13. M. Ciocarlie, K. Hsiao, E.G. Jones, S. Chitta, **R.B. Rusu**, I.A. Sucas. *Towards Reliable Grasping and Manipulation in Household Environments*. Proceedings of 12th International Symposium on Experimental Robotics (ISER) 2010, Dec 18-21, 2010, Delhi, India.
  14. Z.C. Marton, D. Pangercic, **R.B. Rusu**, A. Holzbach, M. Beetz. *Hierarchical Object Geometric Categorization and Appearance Classification for Mobile Manipulation*. Proceedings of the 2010 IEEE-RAS International Conference on Humanoid Robots, Nashville, TN, USA, December 6-8, 2010.
  15. **R.B. Rusu**, G. Bradski, R. Thibaux, J. Hsu. *Fast 3D Recognition and Pose Using the Viewpoint Feature Histogram*. Proceedings of the 23rd IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Taipei, Taiwan, October 18-22, 2010.
  16. W. Meeussen, M. Wise, S. Glaser, S. Chitta, C. McGann, P. Mihelich, E. Marder-Eppstein, M. Muja, V. Eruhimov, T. Foote, J. Hsu, **R.B. Rusu**, B. Marthi, G. Bradski, K. Konolige, B. Gerkey, E. Berger. *Autonomous Door Opening and Plugging In with a Personal Robot*. Proceedings of the IEEE International Conference on Robotics and Automation (ICRA), Anchorage, Alaska, May 3-8, 2010.
  17. **R.B. Rusu**, A. Holzbach, R. Diankov, G. Bradski, M. Beetz. *Perception for Mobile Manipulation and Grasping using Active Stereo*. Proceedings of the 9th IEEE-RAS International Conference on Humanoid Robots (Humanoids), Paris, France, December 7-10, 2009.
  18. N. Blodow, **R.B. Rusu**, Z.C. Marton, M. Beetz. *Partial View Modeling and Validation in 3D Laser Scans for Grasping*. Proceedings of the 9th IEEE-RAS International Conference on Humanoid Robots (Humanoids), Paris, France, December 7-10, 2009.
  19. U. Klank, D. Pangercic, **R.B. Rusu**, M. Beetz. *Real-time CAD Model Matching for Mobile Manipulation and Grasping*. Proceedings of the 9th IEEE-RAS International Conference on Humanoid Robots (Humanoids), Paris, France, December 7-10, 2009.
  20. Z.C. Marton, L. Goron, **R.B. Rusu**, M. Beetz. *Reconstruction and Verification of 3D Object Models for Grasping*. Proceedings of the 14th International Symposium on Robotics Research (ISRR), Lucerne, Switzerland, August 31 - September 3, 2009.
  21. **R.B. Rusu**, W. Meeussen, S. Chitta, M. Beetz. *Laser-based Perception for Door and Handle Identification*. Proceedings of the International Conference on Advanced Robotics (ICAR), Munich, Germany, June 22-26, 2009. Best paper award.
  22. Z.C. Marton, **R.B. Rusu**, D. Jain, U. Klank, M. Beetz. *Probabilistic Categorization of Kitchen Objects in Table Settings with a Composite Sensor*. Proceedings of the 22nd IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), St. Louis, USA, October 11-15, 2009.
  23. **R.B. Rusu**, I.A. Sucas, B. Gerkey, S. Chitta, M. Beetz, L.E. Kavraki. *Real-time Perception-Guided Motion Planning for a Personal Robot*. Proceedings of the 22nd IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), St. Louis, USA, October 11-15, 2009.
  24. **R.B. Rusu**, Z.C. Marton, N. Blodow, A. Holzbach, M. Beetz. *Model-based and*

- Learned Semantic Object Labeling in 3D Point Cloud Maps of Kitchen Environments*. Proceedings of the 22nd IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), St. Louis, USA, October 11-15, 2009.
25. **R.B. Rusu**, N. Blodow, Z.C. Marton, M. Beetz. *Close-range Scene Segmentation and Reconstruction of 3D Point Cloud Maps for Mobile Manipulation in Human Environments*. Proceedings of the 22nd IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), St. Louis, USA, October 11-15, 2009.
  26. **R.B. Rusu**, A. Holzbach, N. Blodow, M. Beetz. *Fast Geometric Point Labeling using Conditional Random Fields*. Proceedings of the 22nd IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), St. Louis, USA, October 11-15, 2009.
  27. **R.B. Rusu**, N. Blodow, M. Beetz. *Fast Point Feature Histograms (FPFH) for 3D Registration*. Proceedings of the IEEE International Conference on Robotics and Automation (ICRA), Kobe, Japan, May 12-17, 2009.
  28. Z.C. Marton, **R.B. Rusu**, M. Beetz. *On Fast Surface Reconstruction Methods for Large and Noisy Datasets*. Proceedings of the IEEE International Conference on Robotics and Automation (ICRA), Kobe, Japan, May 12-17, 2009.
  29. B. Morisset, **R.B. Rusu**, A. Sundaresan, K. Hauser, M. Agrawal, J.C. Latombe, M. Beetz. *Leaving Flatland: Toward Real-Time 3D Navigation*. Proceedings of the IEEE International Conference on Robotics and Automation (ICRA), Kobe, Japan, May 12-17, 2009.
  30. M.R. Blas, **R.B. Rusu**, M. Blanke, M. Beetz. *Fault-tolerant 3D Mapping with Application to an Orchard Robot*. Proceedings of the 7th IFAC International Symposium on Fault Detection, Supervision and Safety of Technical Processes (SAFEPROCESS), Barcelona, Spain, June 30 - July 3, 2009.
  31. M. Beetz, F. Stulp, B. Radig, J. Bandouch, N. Blodow, M. E. Dolha, A. Fedrizzi, D. Jain, U. Klank, I. Kresse, A. Maldonado, Z. C. Marton, L. Mösenlechner, F. Ruiz, **R. B. Rusu**, and M. Tenorth. *Cognition, Control and Learning for Everyday Manipulation Tasks in Human Environments*. Proceedings of the IEEE 17th International Symposium on Robot and Human Interactive Communication (RO-MAN), Munich, Germany, August 1-3, 2008. Invited paper.
  32. D. Pangercic, **R.B. Rusu**, and M. Beetz. *3D-Based Monocular SLAM for Mobile Agents Navigating in Indoor Environments*. Proceedings of IEEE International Conference on Emerging Technology and Factory Automation (ETFA), Hamburg, Germany, September 15-18, 2008.
  33. **R.B. Rusu**, A. Sundaresan, B. Morisset, M. Agrawal, and M. Beetz. *Leaving Flatland: Realtime 3D Stereo Semantic Reconstruction*. Proceedings of the International Conference on Intelligent Robotics and Applications (ICIRA), Wuhan, China, October 15-17, 2008.
  34. **R.B. Rusu**, Z. C. Marton, N. Blodow, and M. Beetz. *Learning Informative Point Classes for the Acquisition of Object Model Maps*. Proceedings of the 10th International Conference on Control, Automation, Robotics and Vision (ICARCV), Hanoi, Vietnam, December 17-20, 2008.
  35. **R. B. Rusu**, Z. C. Marton, N. Blodow, M. E. Dolha, and M. Beetz. *Functional Object Mapping of Kitchen Environments*. Proceedings of the 21st IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Nice, France, September 22-26, 2008.
  36. **R. B. Rusu**, N. Blodow, Z. C. Marton, and M. Beetz. *Aligning Point Cloud Views using Persistent Feature Histograms*. Proceedings of the 21st IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Nice, France, September 22-26, 2008.
  37. **R. B. Rusu**, Z. C. Marton, N. Blodow, and M. Beetz. *Persistent Point Feature*



- Histograms for 3D Point Clouds*. Proceedings of the 10th International Conference on Intelligent Autonomous Systems (IAS-10), Baden-Baden, Germany, July 23-25, 2008.
38. **R. B. Rusu**, J. Bandoch, Z. C. Marton, N. Blodow, and M. Beetz. *Action Recognition in Intelligent Environments using Point Cloud Features Extracted from Silhouette Sequences*. Proceedings of the IEEE 17th International Symposium on Robot and Human Interactive Communication (RO-MAN), Munich, Germany, August 1-3, 2008.
  39. **R. B. Rusu**, N. Blodow, Z. Marton, A. Soos, M. Beetz. *Towards 3D Object Maps for Autonomous Household Robots*. Proceedings of the 20th IEEE International Conference on Intelligent Robots and Systems (IROS), San Diego, CA, USA, Oct 29 - 2 Nov, 2007.
  40. M. Kranz, A. Maldonado, **R. B. Rusu**, B. Hoernler, G. Rigoll, M. Beetz, and A. Schmidt. *Sensing Technologies and the Player-Middleware for Context-Awareness in Kitchen Environments*. Proceedings of Fourth International Conference on Networked Sensing Systems (INSS), Braunschweig, Germany, June 6-8, 2007.
  41. M. Kranz, A. Maldonado, B. Hörnler, **R. B. Rusu**, M. Beetz, G. Rigoll, A. Schmidt. *A Knife and a Cutting Board as Implicit User Interface - Towards Context-Aware Kitchen Utilities*. Proceedings of First International Conference on Tangible and Embedded Interaction (TEI), Baton Rouge, Louisiana, USA, February 15-17, 2007.
  42. **R. B. Rusu**, R. Robotin, G. Lazea, C. Marcu. *Towards Open Architectures for Mobile Robots: ZeeRO*. Proceedings of IEEE-TTTC International Conference on Automation, Quality & Testing, Robotics (AQTR), Cluj-Napoca, Romania, May 25-28, 2006.
  43. **R. B. Rusu**, L. Miclea, S. Enyedi. *Robotux - a multiagent robot based security system*. Proceedings of IEEE-TTTC International Conference on Automation, Quality & Testing, Robotics (AQTR), Cluj-Napoca, Romania, May 13-15, 2004.

#### **Refereed Workshops and Symposia:**

1. D. Holz, A. J. B. Trevor, M. Dixon, S. Gedikli, **R.B. Rusu**, S. Behnke. *Fast segmentation of RGB-D images for semantic scene understanding*. Proceedings of the ICRA Workshop on Semantic Perception and Mapping for Knowledge-enabled Service Robotics, 2012.
2. A. Aldoma, N. Blodow, D. Gossow, S. Gedikli, **R.B. Rusu**, M. Vincze, G. Bradski. *CAD-Model Recognition and 6DOF Pose Estimation Using 3D Cues*. Proceedings of the 3rd International IEEE Workshop on 3D Representation and Recognition (3dRR-11), in association with the 13th IEEE International Conference on Computer Vision (ICCV), Barcelona, Spain, November 7, 2011.
3. B. Steder, **R.B. Rusu**, K. Konolige, W. Burgard. *NARF: 3D Range Image Features for Object Recognition*. Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), workshop on Defining and Solving Realistic Perception Problems in Personal Robotics, Taipei, Taiwan, October 8, 2010. Invited paper.
4. K. Wurm, E.G. Jones, **R.B. Rusu**. *Modeling the World Around Us :: An Efficient 3D Representation for Personal Robotics*. Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), workshop on Defining and Solving Realistic Perception Problems in Personal Robotics, Taipei, Taiwan, October 8, 2010. **Invited paper**.
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