Stan Birchfield

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http://www.cecas.clemson.edu/~stb
Google scholar
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EDUCATION

Stanford University, Ph.D. Electrical Engineering (Computer Science minor), 1999
Stanford University, M.S. Electrical Engineering, 1996
Clemson University, B.S. Electrical Engineering (*summa cum laude* with honors), 1993

PROFESSIONAL EXPERIENCE

NVIDIA Corporation, Redmond, WA. Senior Research Manager, 2019–
NVIDIA Corporation, Redmond, WA. Principal Research Scientist, 2016–2019
Microsoft Research, Redmond, WA. Principal Software Development Engineer, 2013–2016
TrafficVision, Anderson, SC. Co-Founder and Technical Advisor, 2010–
Clemson University, Clemson, SC. Associate Professor of ECE (with tenure), 2009–2013
Clemson University, Clemson, SC. Assistant Professor of ECE, 2003–2009
Quindi Corporation (startup), Palo Alto, CA. Research Engineer, Software Architect, and Technical Lead, 1999–2003
Stanford University, Stanford, CA. Graduate Research Assistant, 1995–1999
Autodesk Corporation, Mountain View, CA. Summer Intern, 1996–1997
NASA Research Center, Langley, VA. Summer Intern, 1992

CONSULTING EXPERIENCE

National Institute for Medical Informatics, Washington, DC, 2004–2005
Sun Microsystems, Menlo Park, CA, 2002–2003
SRI International, Menlo Park, CA, 2002–2005
Canon Research Center America, Palo Alto, CA, 1998–1999
Swing Lab, Berkeley, CA, 1997.

PROFESSIONAL ACTIVITIES

Editor, *IROS* 2022–2024
Associate Editor, *IEEE Trans. on ITS* 2013–2016; *MVA* 2012–2018; *ICRA* 2012–2020; *IROS* 2013–2020
Program Committee, *CVPR* 2003–2013; *ICCV* 2005–2011; *ECCV* 2006–2008; *BMVC* 2008–2011; *RSS* 2011–2013
Co-Chair, oral presentation sessions: *ICRA* 2013, ICRA 2012, IROS 2010, IROS 2012
NSF Panelist, 2009–2011

MEMBERSHIPS

Senior member, Institute of Electrical and Electronics Engineers (IEEE)

PUBLICATIONS

Books

1. S Birchfield. ***Image Processing and Analysis***, Cengage Learning, 2017
   ISBN 978-1-285-17952-0. (718 pages)

Book Chapters

1. Z Chen and S Birchfield. **Vision-Based Path Following without Calibration**
   In *Mobile Robots Navigation*, InTech, pp. 427-446, Mar 2010

2. S Pundlik and S Birchfield. **Motion-Based View-Invariant Motion Detection and Pose Estimation** In *Advances in Visual Computing: Lecture Notes vol. 5875*, Springer, pp. 425-434, 2009

Journal Publications

1. W Sun, Z Qin, H Deng, J Wang, Y Zhang, K Zhang, N Barnes, S Birchfield, L Kong, Y Zhong. **Vicinity Vision Transformer**. *IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI)*, 45(10), Oct 2023
2. Y Zhong, C Loop, W Byeon, S Birchfield, Y Dai, K Zhang, A Kamenev, T Breuel, H Li, J Kautz. **Displacement-Invariant Cost Computation for Stereo Matching**. *Intl. J. of Computer Vision (IJCV)*, 130(5):1196-1209, 2022
3. C Cheng, M Mukadam, J Issac, S Birchfield, D Fox, B Boots, N Ratliff. **RMPflow: A Geometric Framework for Generation of Multi-Task Motion Policies**. *IEEE Trans. Auto. Sci. Eng. (T-ASE)*, 18(3):968-987, Jul 2021
4. X Zhao, D Dawson, W Sarasua, S Birchfield. **Multiple Hypothesis Tracking with Kinematics and Appearance Models on Traffic Flow for Wide Area Traffic Surveillance**. *ASCE J. of Civil Eng.*, 33(3), May 2019
5. X Zhao, D Dawson, W Sarasua, S Birchfield. **Automated Traffic Surveillance System with Aerial Camera Arrays Imagery: Macroscopic Data Collection with Vehicle Tracking**. *J. of Comp. in Civil Eng.*, 31(3), 2017
6. B Peasley and S Birchfield. **RGBD Point Cloud Alignment Using Lucas-Kanade Data Association and Automatic Error Metric Selection**. *IEEE Transactions on Robotics*, 31(6):1548-1554, Dec 2015
7. X Huang, I Walker, S Birchfield. **Occlusion-Aware Multi-View Reconstruction of Articulated Objects for Manipulation**. *Robotics and Autonomous Systems*, 62(4):497-505, Apr 2014
8. D Dawson and S Birchfield. **An Energy Minimization Approach to Automatic Traffic Camera Calibration Using MCMC**. *IEEE Trans. on Intelligent Transportation Systems*, 14(3):1095-1108, Sep 2013
9. B Willimon, I Walker, S Birchfield. **Classification of Clothing Using Mid-Level Layers**. *ISRN Robotics*, Jan 2013
10. B Willimon, S Birchfield, I Walker. **Interactive Perception of Rigid and Non-Rigid Objects**. *International Journal of Advanced Robotic Systems*, v. 9, Sep 2012
11. V Murali and S Birchfield. **Autonomous Exploration Using Rapid Perception of Low-Resolution Image Information**. *Autonomous Robots*, 32(2):115-128, Feb 2012
12. N Pradhan, N Gohad, B Orihuela, T Burg, S Birchfield, D Rittschof, A Mount. **Development of an Automated Algorithm for Tracking and Quantifying Barnacle Cyprid Settlement Behavior**. *Journal of Experimental Marine Biology and Ecology*, v. 410, pp. 21-28, Dec 2011
13. Z Chen, Y Li, S Birchfield. **Visual Detection of Lintel-Occluded Doors by Integrating Multiple Cues Using a Data-Driven Markov Chain Monte Carlo Process**. *Robotics and Auton. Sys.*, 59(11):966-976, Nov 2011
14. S Pundlik, S Birchfield, D Woodard. **Iris Segmentation in Non-Ideal Images Using Graph Cuts**. *Image and Vision Computing*, 28(12):1671-1681, Dec 2010
15. N Kanhere, S Birchfield, W Sarasua, S Khoeini. **Traffic Monitoring of Motorcycles During Special Events Using Video Detection**. *Transportation Research Record*, No. 2160, pp. 69-76, 2010
16. N Kanhere and S Birchfield. **A Taxonomy and Analysis of Camera Calibration Methods for Traffic Monitoring Applications**. *IEEE Transactions on Intelligent Transportation Systems*, 11(2): 441-452, Jun 2010
17. G Zeng, S Birchfield, C Wells. **Rapid Automated Detection of Roots in Minirhizotron Images**. *Machine Vision and Applications*, 21(3):309-317, Apr 2010
18. Z Chen and S Birchfield. **Qualitative Vision-Based Path Following**. *IEEE Transactions on Robotics*, 25(3):749-754, Jun 2009
19. N Kanhere, S Birchfield, W Sarasua. **Automatic Camera Calibration Using Pattern Detection for Vision-Based Speed Sensing**. *Transportation Research Record*, No. 2086, pp. 30-39, 2008
20. S Pundlik and S Birchfield. **Real-Time Motion Segmentation of Sparse Feature Points at Any Speed**. *IEEE Transactions on Systems, Man, and Cybernetics Part B: Cybernetics*, 38(3):731-742, Jun 2008
21. N Kanhere and S Birchfield. **Real-Time Incremental Segmentation and Tracking of Vehicles at Low Camera Angles Using Stable Features**. *IEEE Trans. on Intelligent Transportation Systems*, 9(1):148-160, Mar 2008
22. G Zeng, S Birchfield, C Wells. **Automatic Discrimination of Fine Roots in Minirhizotron Images**. *New Phytologist*, 177(2):549-557, Jan 2008
23. S Birchfield and D Gillmor. **Acoustic Source Direction System and Method** (review of acoustical patent 7,039,198). *Journal of the Acoustical Society of America*, 122(2):702, 2007
24. N Kanhere, S Birchfield, W Sarasua, T Whitney. **Real-Time Detection and Tracking of Vehicle Base Fronts for Measuring Traffic Counts and Speeds on Highways**. *Transportation Research Record: Journal of the Transportation Research Board*, No. 1993, pp. 155-164, 2007

25. S Birchfield and S Rangarajan. **Spatial Histograms for Region-Based Tracking**. *Electronics and Telecommunications Research Institute (ETRI) Journal*, 29(5):697-699, Oct 2007
26. S Birchfield, B Natarajan, C Tomasi. **Correspondence as Energy-Based Segmentation**. *Image and Vision Computing*, 25(8):1329-1340, Aug 2007
27. G Zeng, S Birchfield, C Wells. **Detecting and Measuring Fine Roots in Minirhizotron Images Using Matched Filtering and Local Entropy Thresholding**. *Machine Vision and Applications*, 17(4):265-278, 2006
28. N Kanhere, S Birchfield, W Sarasua. **Vehicle Segmentation and Tracking in the Presence of Occlusions**. *Transportation Research Record: Journal of the Trans. Research Board*, No. 1944, pp. 89-97, 2006
29. S Birchfield and A Subramanya. **Microphone Array Position Calibration by Basis-Point Classical Multidimensional Scaling**. *IEEE Transactions on Speech and Audio Processing*, 13(5):1025-1034, Sept. 2005
30. S Birchfield and C Tomasi. **Depth Discontinuities by Pixel-to-Pixel Stereo**. *International Journal of Computer Vision (IJCV)*, 35(3):269-293, Dec 1999
31. S Birchfield and C Tomasi. **A Pixel Dissimilarity Measure That is Insensitive to Image Sampling**. *IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI)*, 20(4):401-406, Apr 1998
32. I Nourbakhsh, R Powers, S Birchfield. **Dervish: An Office Navigating Robot**. *AI Magazine*, 16(2):53-60, Summer 1995

Refereed Conference Proceedings

1. B Wen, W Yang, J Kautz, S Birchfield. **FoundationPose: Unified 6D Pose Estimation and Tracking of Novel Objects**. *CVPR* 2024
2. Y Weng, B Wen, J Tremblay, V Blukis, D Fox, L Guibas, S Birchfield. **Neural Implicit Representation for Building Digital Twins of Unknown Articulated Objects**. *CVPR* 2024
3. Z Tang, Z Ren, X Zhao, B Wen, J Tremblay, S Birchfield, A Schwing. **NeRFDeformer: NeRF Transformation from a Single View via 3D Scene Flows**. *CVPR* 2024
4. A Guo, B Wen, J Yuan, J Tremblay, S Tyree, J Smith, S Birchfield. **HANDAL: A Dataset of Real-World Manipulable Object Categories with Pose Annotations, Affordances, and Reconstructions**. *IROS* 2023
5. B Wen, J Tremblay, V Blukis, S Tyree, T Müller, A Evans, D Fox, J Kautz, S Birchfield. **BundleSDF: Neural 6-DoF Tracking and 3D Reconstruction of Unknown Objects**. *CVPR* 2023
6. T Lee, J Tremblay, V Blukis, B Wen, B Lee, I Shin, S Birchfield, I Kweon, K Yoon. **TTA-COPE: Test-Time Adaptation for Category-Level Object Pose Estimation**. *CVPR* 2023
7. Y Ye, X Li, A Gupta, S De Mello, S Birchfield, J Song, S Tulsiani, S Liu. **Affordance Diffusion: Synthesizing Hand-Object Interactions**. *CVPR* 2023
8. Y Lin, T Müller, J Tremblay, B Wen, S Tyree, A Evans, P Vela, S Birchfield. **Parallel Inversion of Neural Radiance Fields for Robust Pose Estimation**. *ICRA* 2023
9. Z Tang, B Sundaralingam, J Tremblay, B Wen, Y Yuan, S Tyree, C Loop, A Schwing, S Birchfield. **RGB-Only Reconstruction of Tabletop Scenes for Collision-Free Manipulator Control**. *ICRA* 2023
10. V Blukis, T Lee, J Tremblay, B Wen, I Kweon, K Yoon, D Fox, S Birchfield. **One-Shot Neural Fields for 3D Object Understanding**. *CVPR Workshop* 2023
11. F Sun, J Tremblay, V Blukis, K Lin, D Xu, B Ivanovic, P Karkus, S Birchfield, D Fox, R Zhang, Y Li, J Wu, M Pavone, N Haber. **Partial-View Object View Synthesis via Filtered Inversion**. *CVPR Workshop* 2023
12. Y Labbé, L Manuelli, A Mousavian, S Tyree, S Birchfield, J Tremblay, J Carpentier, M Aubry, D Fox, J Sivic. **MegaPose: 6D Pose Estimation of Novel Objects via Render & Compare**. *CoRL* 2022
13. S Tyree, J Tremblay, T To, J Cheng, T Mosier, J Smith, S Birchfield. **6-DoF Pose Estimation of Household Objects for Robotic Manipulation: An Accessible Dataset and Benchmark**. *IROS* 2022
14. J Zhou, J Wang, J Zhang, W Sun, J Zhang, S Birchfield, D Guo, L Kong, M Wang, Y Zhong. **Audio-Visual Segmentation**. *ECCV* 2022
15. A Kamenev, L Wang, O Bohan, I Kulkarni, B Kartal, A Molchanov, S Birchfield, D Nistér, N Smolyanskiy. **PredictionNet: Real-Time Joint Probabilistic Traffic Prediction for Planning, Control, and Sim**. *ICRA* 2022
16. Y Lin, J Tremblay, S Tyree, P Vela, S Birchfield. **Single-Stage Keypoint-Based Category-Level Object Pose Estimation from an RGB Image**. *ICRA* 2022
17. Y Lin, J.Tremblay, S Tyree, P Vela, S Birchfield. **Keypoint-Based Category-Level Object Pose Tracking from an RGB Sequence with Uncertainty Estimation**. *ICRA* 2022

18. J Tremblay, M Meshry, A Evans, J Kautz, A Keller, S Khamis, C Loop, N Morrical, T Müller, K Nagano, T Takikawa, S Birchfield. **RTMV: A Ray-Traced Multi-View Synthetic Dataset for Novel View Synthesis**. *ECCV Workshop* 2022
19. A Prakash, S Debnath, J Lafleche, S Birchfield, E Cameracci, G State, M Law. **Self-Supervised Real-to-Sim Scene Generation**. *ICCV* 2021
20. V Kumar, D Hoeller, B Sundaralingam, J Tremblay, S Birchfield. **Joint Space Control via Deep Reinforcement Learning**. *IROS* 2021
21. Y Lin, J Tremblay, S Tyree, P Vela, S Birchfield. **Multi-View Fusion for Multi-Level Robotic Scene Understanding**. *IROS* 2021
22. Y Zhong, J Wang, Y Dai, S Birchfield, K Zhang, N Smolyanskiy, H Li. **Deep Two-View Structure-from-Motion Revisited**. *CVPR* 2021
23. Y Chao, S Birchfield, D Fox, A Handa, U Iqbal, J Kautz, P Molchanov, J Tremblay, Y Xiang, W Yang, Y Narang. **DexYCB: A Benchmark for Capturing Hand Grasping of Objects**. *CVPR* 2021
24. Y Zhu, J Tremblay, S Birchfield, Y Zhu. **Hierarchical Planning for Long-Horizon Manipulation with Geometric and Symbolic Scene Graphs**. *ICRA* 2021
25. G Shi, Y Zhu, J Tremblay, S Birchfield, F Ramos, A Anandkumar, Y Zhu. **Fast Uncertainty Quantification for Deep Object Pose Estimation**. *ICRA* 2021
26. N Morrical, J Tremblay, Y Lin, S Tyree, S Birchfield, V Pascucci, I Wald. **NViSII: A Scriptable Tool for Photorealistic Image Generation**. *ICLR Workshop* 2021
27. V Kumar, T Hermans, D Fox, S Birchfield, J Tremblay. **Contextual Reinforcement Learning of Visuo-tactile Multi-fingered Grasping Policies**. *NeurIPS Workshop* 2020
28. J Tremblay, S Tyree, T Mosier, S Birchfield. **Indirect Object-to-Robot Pose Estimation from an External Monocular RGB Camera**. *IROS* 2020
29. K Chen, R Oldja, N Smolyanskiy, S Birchfield, A Popov, D Wehr, I Eden, J Pehserl. **MVLidarNet: Real-Time Multi-Class Scene Understanding for Autonomous Driving Using Multiple Views**. *IROS* 2020
30. T Lee, J Tremblay, T To, J Cheng, T Mosier, O Kroemer, D Fox, S Birchfield. **Camera-to-Robot Pose Estimation from a Single Image**. *ICRA* 2020
31. S Iqbal, J Tremblay, T To, J Cheng, E Leitch, A Campbell, K Leung, D McKay, S Birchfield. **Toward Sim-to-Real Directional Semantic Grasping**. *ICRA* 2020
32. A Handa, K Van Wyk, W Yang, J Liang, Y Chao, Q Wan, S Birchfield, N Ratliff, D Fox. **DexPilot: Vision Based Teleoperation of Dexterous Robotic Hand-Arm System**. *ICRA* 2020
33. Z Tang, M Naphade, S Birchfield, J Tremblay, W Hodge, R Kumar, S Wang, X Yang. **PAMTRI: Pose-Aware Multi-Task Learning for Vehicle Re-Identification Using Highly Randomized Synthetic Data**. *ICCV* 2019
34. H Tseng, S De Mello, J Tremblay, S Liu, S Birchfield, M Yang, J Kautz. **Few-Shot Viewpoint Estimation**. *BMVC* 2019
35. Z Tang, M Naphade, M Liu, X Yang, S Birchfield, S Wang, R Kumar, D Anastasiu, J Hwang. **CityFlow: A City-Scale Benchmark for Multi-Target Multi-Camera Vehicle Tracking and Re-Identification**. *CVPR* 2019
36. B Sundaralingam, A Lambert, A Handa, B Boots, T Hermans, S Birchfield, N Ratliff, D Fox. **Robust Learning of Tactile Force Estimation through Robot Interaction**. *ICRA* 2019 **Best Robot Manipulation Paper, finalist**
37. A Prakash, S Boochoon, M Brophy, D Acuna, E Cameracci, G State, O Shapira, S Birchfield. **Structured Domain Randomization: Bridging the Reality Gap by Context-Aware Synthetic Data**. *ICRA* 2019
38. C Cheng, M Mukadam, J Issac, S Birchfield, D Fox, B Boots, N Ratliff. **RMPflow: A Computational Graph for Automatic Motion Policy Generation**. *WAFR* 2018
39. J Tremblay, T To, B Sundaralingam, Y Xiang, D Fox, S Birchfield. **Deep Object Pose Estimation for Semantic Robotic Grasping of Household Objects**. *CoRL* 2018
40. J Tremblay, T To, S Birchfield. **Falling Things: A Synthetic Dataset for 3D Object Detection and Pose Estimation**. *CVPR Workshop* 2018
41. N Smolyanskiy, A Kamenev, S Birchfield. **On the Importance of Stereo for Accurate Depth Estimation: An Efficient Semi-Supervised Deep Neural Network Approach**. *CVPR Workshop* 2018
42. J Tremblay, A Prakash, D Acuna, M Brophy, V Jampani, C Anil, T To, E Cameracci, S Boochoon, S Birchfield. **Training Deep Networks with Synthetic Data: Bridging the Reality Gap by Domain Randomization**. *CVPR Workshop* 2018

43. J Tremblay, T To, A Molchanov, S Tyree, J Kautz, S Birchfield. **Synthetically Trained Neural Networks for Learning Human-Readable Plans from Real-World Demonstrations**. *ICRA* 2018
44. N Smolyanskiy, A Kamenev, J Smith, S Birchfield. **Toward Low-Flying Autonomous MAV Trail Navigation Using Deep Neural Networks for Environmental Awareness**. *IROS* 2017
45. S Birchfield. **Reverse-Projection Method for Measuring Camera MTF**. *EI* 2017
46. X Zhao, D Dawson, W Sarasua, S Birchfield. **An Automated Traffic Surveillance System with Aerial Camera Arrays: Data Collection with Vehicle Tracking**. *TRB Annual Mtg* 2016
47. A Feniello, H Dang, S Birchfield. **Program Synthesis by Examples for Object Repositioning Tasks**. *IROS* 2014
48. S Hickson, S Birchfield, I Essa, H Christensen. **Efficient Hierarchical Graph-Based Segmentation of RGBD Videos**. *CVPR* 2014
49. H Kikkeri, G Parent, M Jalobeanu, S Birchfield. **An Inexpensive Method for Evaluating the Localization Performance of a Mobile Robot Navigation System**. *ICRA* 2014
50. B Peasley and S Birchfield. **Fast and Accurate PoseSLAM by Combining Relative and Global State Spaces**. *ICRA* 2014
51. N Pradhan, S Birchfield, T Burg. **A Person Follower Mobile Robot System for Indoor Environments**. *IROS Workshop* 2013
52. N Pradhan, T Burg, S Birchfield, U Hasirci. **Indoor Navigation for Mobile Robots using Predictive Fields**. *ACC* 2013
53. B Peasley and S Birchfield. **Improving Projective Data Association with Lucas-Kanade for RGBD-ICP**. *ICRA* 2013
54. B Willimon, I Walker, S Birchfield. **A New Approach to Clothing Classification using Mid-Level Layers**. *ICRA* 2013
55. B Willimon, I Walker, S Birchfield. **3D Non-Rigid Deformable Surface Estimation without Feature Correspondence**. *ICRA* 2013
56. B Peasley and S Birchfield. **Real-Time Obstacle Detection and Avoidance in the Presence of Specular Surfaces Using an Active 3D Sensor**. *WoRV* 2013
57. B Willimon, S Hickson, I Walker, S Birchfield. **An Energy Minimization Approach to 3D Non-Rigid Deformable Surface Estimation Using RGBD Data**. *IROS* 2012
58. B Peasley, S Birchfield, A Cunningham, F Dellaert. **Accurate On-Line 3D Occupancy Grids Using Manhattan World Constraints**. *IROS* 2012
59. Y Li, V Murali, S Birchfield. **Extracting Minimalistic Corridor Geometry from Low-Res Images**. *ICRA* 2012
60. X Huang, I Walker, S Birchfield. **Occlusion-Aware Reconstruction and Manipulation of 3D Articulated Objects**. *ICRA* 2012
61. B Willimon, S Birchfield, I Walker. **Model for Unfolding Laundry using Interactive Perception**. *IROS* 2011
62. N Pradhan, T Burg, S Birchfield. **Robot Crowd Navigation using Predictive Position Fields in the Potential Function Framework**. *ACC* 2011
63. B Willimon, S Birchfield, I Walker. **Classification of Clothing using Interactive Perception**. *ICRA* 2011
64. N Kanhere, S Birchfield, W Sarasua, S Khoeini. **Evaluation of a Computer-Vision Tracking System for Collecting Traffic Data**. *TRB Annual Meeting* 2011
65. T Grindinger, V Murali, S Tetreault, A Duchowski, S Birchfield, P Orero. **Algorithm for Discriminating Aggregate Gaze Points: Comparison with Salient Regions-Of-Interest**. *IWGSI* 2010
66. Y Li and S Birchfield. **Image-Based Segmentation of Indoor Corridor Floors for a Mobile Robot**. *IROS* 2010
67. B Willimon, S Birchfield, I Walker. **Rigid and Non-Rigid Classification Using Interactive Perception**. *IROS* 2010
68. N Kanhere, S Birchfield, W Sarasua, S Khoeini. **Traffic Monitoring of Motorcycles During Special Events Using Video Detection**. *TRB Annual Meeting* 2010
69. S Pundlik and S Birchfield. **Motion-Based View-Invariant Articulated Motion Detection and Pose Estimation Using Sparse Point Features**. *ISVC* 2009
70. P Chockalingam, N Pradeep, S Birchfield. **Adaptive Fragments-Based Tracking of Non-Rigid Objects Using Level Sets**. *ICCV* 2009
71. W Ryan, D Woodard, A Duchowski, S Birchfield. **Adapting Starburst for Elliptical Iris Segmentation**. *BTAS* 2008
72. S Birchfield and S Pundlik. **Joint Tracking of Features and Edges**. *CVPR* 2008
73. S Pundlik, D Woodard, S Birchfield. **Non-Ideal Iris Segmentation Using Graph Cuts**. *CVPR Workshop* 2008
74. Z Chen and S Birchfield. **Visual Detection of Lintel-Occluded Doors from a Single Image**. *CVPR Workshop* 2008

75. V Murali and S Birchfield. **Autonomous Navigation and Mapping Using Monocular Low-Resolution Grayscale Vision**. *CVPR Workshop* 2008
76. W Ryan, A Duchowski, S Birchfield. **Limbus/Pupil Switching for Wearable Eye Tracking Under Variable Lighting Conditions**. *ETRA* 2008
77. N Kanhere, S Birchfield, W Sarasua. **Automatic Camera Calibration Using Pattern Detection for Vision-Based Speed Sensing**. *TRB Annual Meeting* 2008
78. Z Chen and S Birchfield. **Person Following with a Mobile Robot Using Binocular Feature-Based Tracking**. *IROS* 2007
79. N Rane and S Birchfield. **Isomap Tracking with Particle Filtering**. *ICIP* 2007
80. N Kanhere, S Birchfield, W Sarasua, T Whitney. **Real-Time Detection and Tracking of Vehicle Base Fronts for Measuring Traffic Counts and Speeds on Highways**. *TRB Annual Meeting* 2007
81. S Pundlik and S Birchfield. **Motion Segmentation at Any Speed**. *BMVC* 2006
82. Z Chen and S Birchfield. **Qualitative Vision-Based Mobile Robot Navigation**. *ICRA* 2006
83. N Kanhere, S Birchfield, W Sarasua. **Vehicle Segmentation and Tracking in the Presence of Occlusions**. *TRB Annual Meeting* 2006
84. S Birchfield and S Rangarajan. **Spatiograms Versus Histograms for Region-Based Tracking**. *CVPR* 2005
85. N Kanhere, S Pundlik, S Birchfield. **Vehicle Segmentation and Tracking from a Low-Angle Off-Axis Camera**. *CVPR* 2005
86. S Guduru, S Narasimhan, S Birchfield, B Gao. **Analysis of Neurite Outgrowth for a Laser Patterned Neuronal Culture**. *IEEE EMBS Special Topic Conf. on Neural Eng.* 2005
87. S Birchfield and R Gangishetty. **Acoustic Localization by Interaural Level Difference**. *ICASSP* 2005
88. S Birchfield. **A Unifying Framework for Acoustic Localization**. *EUSIPCO* 2004
89. A Subramanya and S Birchfield. **Extension and Evaluation of MDS for Geometric Microphone Array Calibration**. *EUSIPCO* 2004
90. S Birchfield. **Geometric Microphone Array Calibration by Multidimensional Scaling**. *ICASSP* 2003
91. S Birchfield and D Gillmor. **Fast Bayesian Acoustic Localization**. *ICASSP* 2002
92. S Birchfield and D Gillmor. **Acoustic Source Direction by Hemisphere Sampling**. *ICASSP* 2001
93. S Birchfield and C Tomasi. **Multiway Cut for Stereo and Motion with Slanted Surfaces**. *ICCV* 1999
94. S Birchfield. **Elliptical Head Tracking Using Intensity Gradients and Color Histograms**. *CVPR* 1998
95. S Birchfield and C Tomasi. **Depth Discontinuities by Pixel-to-Pixel Stereo**. *ICCV* 1998
96. S Birchfield. **An Elliptical Head Tracker**. Asilomar Conference on Signals, Systems, and Computers 1997

Other Publications

1. J Tremblay, B Wen, V Blukis, B Sundaralingam, S Tyree, S Birchfield. **Diff-DOPE: Differentiable Deep Object Pose Estimation**. arXiv:2310.00463, 2023
2. Y Zhong, C Loop, W Byeon, S Birchfield, Y Dai, K Zhang, A Kamenev, T Breuel, H Li, J Kautz. **Displacement Invariant Cost Computation for Efficient Stereo Matching**. *arXiv:2012.00899*, 2020
3. J Wang, V Jampani, D Sun, C Loop, S Birchfield, J Kautz. **Improving Deep Stereo Network Generalization with Geometric Priors**. *arXiv:2008.11098*, 2020
4. A. Molchanov, K. Hausman, S. Birchfield, G. Sukhatme. **Region Growing Curriculum Generation for Reinforcement Learning**. *arXiv:1807.01425*, 2018
5. N Ratliff, J Issac, D Kappler, S Birchfield, D Fox. **Riemannian Motion Policies**. *arXiv:1801.02854*, 2018

INVITED PRESENTATIONS

1. Taiwan S&T Hub Conference, Seattle, WA, Aug 2023
2. NVIDIA GTC Conference, Santa Clara, CA, Apr 2020
3. NVIDIA GTC Conference, Santa Clara, CA, Mar 2019
4. University of Washington, Seattle, WA, May 2017
5. Robotics Summer School, Czech Technical University, Prague, Czech Republic, Jul 2014
6. ICRA 2014 Workshop on Manipulation of Flexible Objects, Hong Kong, May 2014
7. University of Washington, Seattle, WA, May 2014
8. RSS 2013 Workshop on Manipulation with Uncertain Models, Berlin, Germany, Jun 2013
9. ICRA 2013 Workshop on Interactive Perception, Karlsruhe, Germany, May 2013

10. University of Central Florida, Orlando, FL, Nov 2012
11. University of South Carolina, Columbia, SC, Oct 2011
12. TRANSPO 2010 Conference, Ponte Vedra Beach, FL, Dec 2010
13. IROS Conference, Taipei, Taiwan, Oct 2010
14. TRB Committee, National Academy of Sciences, Woods Hole, Massachusetts, Jun 2010
15. TRB Annual Meeting, Washington DC, Jan 2010
16. NATMEC Conference, Seattle, WA, Jun 2010
17. FHWA Motorcycle Demonstration, Washington, DC, May 2008
18. FHWA Motorcycle Traffic Symposium, Washington, DC, Oct 2007
19. CVPR Workshop, Anchorage, AK, Jun 2008
20. BMVC Conference, Edinburgh, Scotland, Sep 2006
21. ICRA Conference, Orlando, Florida, May 2006
22. EUSIPCO Conference, Vienna, Austria, Sep 2004
23. EUSIPCO Conference, Vienna, Austria, Sep 2004
24. ICASSP Conference, Orlando, FL, May 2002
25. St. Olaf College, Northfield, MN, Dec 2004
26. IBM Almaden Research Center, San Jose, CA, Oct 2002
27. SRI International, Menlo Park, CA, Oct 2002
28. Georgia Tech, Atlanta, GA, Oct 2002
29. Clemson University, Clemson, SC, Oct 2002
30. Hewlett-Packard Laboratories, Palo Alto, CA, Sep 2002
31. Honda Research Laboratory, Mountain View, CA, Sep 2002
32. Xerox Palo Alto Research Center, Palo Alto, CA, Mar 1999
33. Hewlett-Packard Laboratories, Palo Alto, CA, Mar 1999
34. Intel Microprocessor Research Laboratories, Santa Clara, CA, Feb 1999
35. SRI International, Menlo Park, CA, Feb 1999
36. Interval Research Center, Palo Alto, CA, Jan 1999
37. IBM Almaden Research Center, San Jose, CA, Oct 1998
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HONORS AND AWARDS

Clemson University Research Scholarship and Artistic Award (URSAAA), 2018
National Science Foundation Graduate Fellowship, 1993–1996
First place in American Association of Artificial Intelligence (AAAI) Mobile Robotics Contest, 1994

GRADUATE STUDENT ADVISING

Postdocs: N Kanhere, 2009–2010
Ph.D. Graduates: B Peasley (Dec 2013), N Pradhan (coadvised with T Burg, Aug 2013), X Huang (Aug 2013), B Willimon (coadvised with I Walker, May 2013), V Murali (Aug 2011), Z Chen (Aug 2010), S Pundlik (Aug 2009), G Zeng (Dec 2008), N Kanhere (Aug 2008)
Masters Thesis Graduates: R Suresh (Dec 2012), S Ficht (May 2012), J Dinger (Aug 2011), Y Li (Aug 2011), K Sundararajan (May 2011), A Apte (Aug 2010), V Gidla (May 2010), B Willimon (Dec 2009), P Chockalingam (Aug 2009), N Pradeep (Aug 2009), T Patil (Aug 2009), J Ingersoll (Aug 2008), V Murali (Aug 2008), C Dunkel (Aug 2008), N Rane (May 2007), P Oswal (Aug 2006), J Reneau (May 2006), X Wang (May 2006), B Natarajan (Dec

2005), S Pundlik (Dec 2005), S Rangarajan (Dec 2005), N Kanhere (Aug 2005), R Gangishetty (Aug 2005), G Zeng (May 2005)

SPONSORED RESEARCH

1. Co-PI, Automated Traffic Surveillance from an Aerial Camera Array, Univ. Tennessee SE Transp. Center, 2014
2. PI, II-NEW: Robot Arms for Interactive Perception of Highly Non-Rigid Objects, NSF 2013–2014
3. Co-PI, Automatic Visual Inspector, BMW 2012–2013
4. Co-PI, Investigation into Real-time Segmentation and Labeling of Rotator Cuff Ultrasound, Clemson 2011–2012
5. Co-PI, Cyberinfrastructure Empowering Future Transportation Systems, Clemson 2011–2012
6. PI, RI: Small: Interactive Perception for Manipulating Non-Rigid Objects, NSF 2010–2013
7. PI, Computer Vision Traffic Sensor for Fixed and Pan-Tilt-Zoom Cameras, TRB 2009-2010
8. PI, Computer Vision-Based Vehicle Tracking System, Omnibond Systems, 2008
9. PI, Automated Traffic Surveillance Using Low-Angle Cameras, SCSU Transportation Center, 2005–2006
10. PI, Vision-Based Robotic Toolkit for Navigating Indoor Environments, NIMI Ph.D. Fellowship, 2005–2009
11. Co-PI, DBI: Feature Recognition Software for Minirhizotron Image Processing, NSF 2005–2008
12. PI, Tracking Vehicles with a Low-Angle Camera, Clemson Research Grant Committee, 2005

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University of Washington, EEP 596, Computer Vision: Classical and Deep Methods, 2020, 2021, 2023
Clemson University, ECE 329, Computer Systems Structures, 2005–2008
Clemson University, ECE 417/617, Elements of Software Engineering, 2004–2012
Clemson University, ECE 429/629, Organization of Computers, 2003–2009
Clemson University, ECE 847, Digital Image Processing, 2004–2015
Clemson University, ECE 877, Computer Vision, 2005–2012
Clemson University, ECE 904, Computer Vision Seminar, 2003–2012
Stanford University, CS223B, Introduction to Computer Vision, 2002 (co-taught with C. Bregler)

UNIVERSITY AND PUBLIC SERVICE

Chair, ECE Graduate Committee, 2009–2013
Department representative, Dean's Faculty Advisory Council, 2004–2005
Chair, Digital Signal Processing Committee, 2005–2006
Co-Chair, Ph.D. Qualifying Exam Software Committee, 2005–2013
Member, Intelligent Systems Committee, 2003–2013
Member, Computer Systems Architecture Committee, 2003–2013
Member, Digital Signal Processing Committee, 2003–2013
Member, Department Chair Search Committee, 2005–2007
Member, Computer Engineering Faculty Search Committee, 2005–2006
Member, Assessment Subcommittee of Undergraduate Program Committee, 2005–2008
Co-advisor, IEEE Southeastcon Robotics Hardware Design Team, 2007–2012 (3rd place, 2007)
CES Faculty Telephone Recruiting Campaign, 2005–2007
Presented robotics lab tour to Youth Learning Institute Summer Camp, July 2011
Organized robotics lab tour to elementary schoolchildren, July 2011

OTHER

Video of traffic monitoring software (jointly with K-C Wang) shown as part of the U. S. Ignite launch at the Eisenhower Executive Office Building of the White House, Washington DC, June 2012
Invited to demo traffic monitoring system at the NCHRP study performed by Texas Transportation Institute, 2012
Invited to demo traffic monitoring system at the FHWA Turner-Fairbanks Highway Research Center, May 2008
Invited to present traffic monitoring system at FHWA Motorcycle Travel Symposium in Washington, DC, Oct. 2007

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