

Gregory D. Hager
Mandell Bellmore Professor
Department of Computer Science
The Johns Hopkins University
3400 N. Charles St.
Baltimore, Maryland 21218
<http://www.cs.jhu.edu/~hager>
March 30, 2019

ACADEMIC POSITIONS

Founding Director, Malone Center for Engineering in Healthcare
Johns Hopkins University, 2016-present

Mandell Bellmore Professor of Computer Science
Johns Hopkins University, 2015-present

Professor of Computer Science with courtesy appointments in **Electrical and Computer Engineering, Mechanical Engineering and Surgery**
Johns Hopkins University, 1999-present.

Chairman, Department of Computer Science
Johns Hopkins University, 2010-2015.

Deputy Director, Center for Computer-Integrated Surgical Systems and Technology
Johns Hopkins University, 2005-2015.

Faculty, Graduate School of Informatics and Science in Health
Technical University of Munich, 2009-2015.

Visiting Professor of Computer Science, Stanford University, 2007-2008.

Associate Professor of Computer Science with secondary appointment in **Electrical Engineering**
Yale University, 1996-1999.

Assistant Professor of Computer Science
Yale University, 1991-1996.

Post-doctoral Research Fellow
University of Pennsylvania, 1990.

Fulbright Fellow
Fraunhofer Inst., IITB & University of Karlsruhe, 1988-1990.

Summer Research Staff
SRI International, 1984.

Summer Research Staff
IBM T.J. Watson Research Center, 1983.

EDUCATION

Ph.D. in Computer Science, University of Pennsylvania, 1988
Dissertation: Active Reduction of Uncertainty in Multi-Sensor Systems
Advisor: Dr. Max Mintz

M.S.E. in Computer Science, University of Pennsylvania, 1985
Thesis: Computational Aspects of Proofs in Modal Logic
Advisor: Dr. Dale Miller

B.A. *Summa Cum Laude*, Luther College, Decorah, Iowa, 1983
Thesis: Heuristic Programming

AWARDS AND HONORS

Fellow of the AAAS, 2019
Fellow of the ACM, 2018
TUM Ambassador, 2017
Fellow of AIMBE, 2017
KUKA Innovation Award, 2016
Fellow of the MICCAI Society, 2015
Hans Fischer Fellow, Institute for Advanced Studies, Technical University of Munich, 2014
Distinguished Alumni Award, Luther College, 2013
Fellow of the IEEE, 2006
Yale Junior Faculty Fellowship, 1995.
Fulbright Post-doctoral Junior Research Fellowship, 1988.
Rubinoff Dissertation Prize, University of Pennsylvania, 1988.
IBM Graduate Fellowship in Manufacturing and Automation, 1986.
National Science Foundation Graduate Fellowship, 1983.

Best Paper Awards:

Best Paper, CARE Workshop, MICCAI, 2018
Best Paper, M2CAI workshop, MICCAI, 2016
Best Paper, AE-CAI Workshop, MICCAI 2012
Best Paper in Medical Robotics, Runner up, MICCAI 2012
Best Paper, Runner up, SPIE Ultrasonics 2009
Best Poster, SPIE Ultrasonics 2006, 2009
Best Journal Paper, Computer-Aided Surgery 2005
Best Student Paper, MICCAI 2005

Best Paper Nominations:

MICCAI, 2016
MICCAI, 2011
Intelligent Robots and Systems, 2004
IEEE Transactions on Robotics and Automation, 1996.
International Symposium on Robotics Research, 1989.

PROFESSIONAL ACTIVITIES

Community Service:

Vice-Chair, IEEE Computer Society Fellows Evaluation Committee, 2018
Co-Chair, Paper Awards Committee, International Conference on Robotics and Automation, 2018

Committee Member, NSF BIO Assistant Director Search, 2017-2018
Invited Speaker, Leadership in Science Policy Institute, CRA, 2017
Chair, NSF IIS Director Search, 2017
Roundtable on AI and Foreign Policy, National Academies, Oct. 2016.
AI-100 Inaugural Study Panel Member, 2015
National Academies Panel on Mechanical Science and Engineering at the Army Research Laboratory, 2015
Co-Chair, Biannual NITRD Review Subcommittee, 2015
Steering Committee, AAAS Information, Computing, and Communication (T) Section, 2014-2016
Chair, Computing Community Consortium (CCC) Council, 2014-2016
Vice Chair, Computing Community Consortium (CCC) Council, 2013-2014
International Advisory Committee, Conference on Computer Vision in Remote Sensing, 2012-2014
International Federation of Robotics Research (IFRR) Board, 2012-present
Computing Community Consortium (CCC) Council Member, 2011-2017
Chair, Computer and Robot Vision Technical Committee of the IEEE Robotics
and Automation Society, 1996-2000.

Advisory Boards:

NSF Computer and Information Science and Engineering Advisory Committee (CISE AC), 2016-present
Computing Research Association, 2014-2018
Medical Veterans Health Institute (MVHI), 2012-2015
Armstrong Patient Safety Institute, 2011-2014
JHU Systems Institute Executive Board, 2011-2015
JHU Engineering for Professionals Computer Science Advisory Committee, 2010-2015
Health Informatics Certificate Advisory Committee, 2010-2015
STI Medical Systems, Inc. 2007-present.
Ikona Medical, Inc. 2004-present.

Visiting Review Committees:

German Aerospace Institute for Mechatronics and Robotics, 2017
University of Utah School of Computer Science, 2016
Heidelberg Special Research Center on Cognitive Surgery, 2015
UPenn Department of Computer Science, 2013
German Aerospace Institute for Mechatronics and Robotics, 2005, 2009
UCSD Dept. of Computer Science, 2008
INRIA, Computer Vision Research, 2004

Editorial Boards:

ACM Transactions on Healthcare, 2018-present
International Journal of Computer Vision, 2004-present
IEEE Transactions on Pattern Analysis and Machine Intelligence, 2008-2011
IEEE Transactions on Robotics and Automation, 1997-2000.
Pattern Analysis and Applications, 1997-2000.

Editor:

Special Issue of IJRR – Best Papers if ISRR 2017
Special Issue of PAMI – Best Papers of CVPR 2013
Special Issue of IJRR on Vision and Robotics, 2011
Special Joint Issue of IJRR and IJCV on Vision and Robotics, 2006
Special Issue of the IEEE Transactions on Robotics and Automation on Visual Servoing, 1996.

Program, Area, General Chair:

Area Chair, Computer Vision and Pattern Recognition, 2005, 2006, 2007, 2008, 2009, 2012, 2019
General Chair, International Symposium on Robotics Research, 2017
General Chair, International Conference on Computer Vision, 2015
General Chair, M2CAI Workshop, MICCAI, 2014
Program Chair, Computer Vision and Pattern Recognition, 2013
Area Chair, Medical Image Computing and Computer Assisted Intervention, 2005, 2012, 2014

Program Committees:

Computer Vision and Pattern Recognition, 2003, 2004
Medical Image Computing and Computer Assisted Intervention, 2002, 2003, 2006, 2007, 2012, 2014, 2015
Vision Interfaces, 2002, 2003
International Conference on Computational Intelligence in Robotics and Automation, 2001
International Symposium on Robotics with Applications 2000.
Vision Algorithms Workshop (with ICCV'99), 1999.
Third Haskell Workshop (with ICFP'99), 1999.
IEEE International Conference on Computer Vision and Pattern Recognition 1996-1999.
International Conference on Computer Vision 1999.
International Conference on Robotics and Automation 1997,1999-2002,2005.
World Manufacturing Congress, 1997.
AAAI Conference 1996.
International Symposium on Robotics and Manufacturing 1996.
Multisensor Fusion and Integration for Intelligent Systems, 1994, 1996.
IEEE International Conference on Intelligent Robotics Systems, 1994, 1996, 2001.
SPIE Sensor Fusion Workshop 1991-1997.

Other Organizing Committees:

ICRA Awards Committee, 2018
New Chairs' Workshop, CRA Conference at Snowbird, 2018
AAAS Panel on AI Augmenting People, Feb, 2018
CCC, AAAI, and OSTP Symposium on AI for Social Good, 2016
CCC Symposium on Computing and Society, 2016
CCC Workshop on Academic Industry Collaboration, 2015
NSF Workshop on Robotics and Cyberphysical Systems, 2015
CCC BRAIN Workshop, 2014
CCC Health IT Workshop, 2012
Task Modeling and Recognition for Skill Assessment and Automation in Robotic Surgery, ICRA 2011.
M2CAI, MICCAI 2009-2013.
Advanced Sensing for Computer-Integrated Surgery, ICRA, 2009.
Tutorial on Computer-Integrated Surgery, ICRA, 2006.
Tutorial on Computer-Integrated Surgery, MICCAI, 2005.
Workshop on Programming Methods in Robotics, CIRA 2001.
Tutorial in Vision-Based Robotics, CIRA 2001.
Dagstuhl Workshop on Sensor-Based Robotics, 2000.
Tutorial on Dynamic Vision, AAAI 2000.
Workshop and Tutorials Chair, CVPR 2000.
Workshop on Robust Vision for Control of Motion, 1998.
Block Island Workshop on Vision and Control, 1997.
Tutorial on Visual Control of Motion, 1996.
Workshop on Visual Servoing, 1994.

Selected Keynote/Plenary Speaker:

What is Artificial Intelligence?

Opening Keynote, National Academies Workshop on Artificial Intelligence Applications for Older Adults and Individuals with Disabilities, September, 2018

Quantifying Surgery: Improving Interventional Medicine Through Data Science
Mini-Keynote Speaker, First ISRM, March, 2018.

What You See is What You Get: Applications of Computer Vision in Interventional Medicine
Hamlyn Symposium Image-Guided Therapies Workshop, June, 2017.

Mentoring Robots: Showing, Telling, and Critiquing
Keynote for the Workshop on Semantic Policy and Action Representations for Autonomous Robots, IROS, Sept. 2017.

From Mimicry to Mastery: Creating Machines that Augment Human Skill,
Plenary Speaker, AAAI Fall Symposium Series, October, 2015.

From Mimicry to Mastery: Creating Machines that Augment Human Skill,
Plenary Speaker, International Conference on Robot Systems, September, 2015.

Life in a World of Ubiquitous Sensing,
Invited Session Keynote, International Conference on Robot Systems, September, 2014.

Computational Modeling and Enhancement of Human Skill,
Invited Session Keynote, Design of Medical Devices Conference, University of Minnesota, April 2014.

Computer Vision and Interventional Medicine,
CVPR Workshop on Computer Vision in Medicine, June 2012

Policy-related Presentations and Testimony:

Report on the CCC Brain Workshop
NSF, Jan 2016.

Report on the CCC Industry Workshop
NSF, CISE Advisory Committee Meeting, 2016.

Testimony before The House Committee On Science, Space And Technology
Subcommittee On Research And Technology:
A Review Of The Networking And Information Technology Research And Development Program
Oct. 2016.

Presentation of the 2015 NITRD Review
President's Council of Advisors on Science and Technology, July 2015.

Presentation of the 2015 NITRD Review
CISE AC, December 2015.

Other Selected Speaking Invitations:

AI and Robotics in Surgery: Assessment, Augmentation, and Automation
UCSD Contextual Robotics Symposium, November, 2018.

CCC Early Career Research Symposium
Opportunities to Serve and Have Impact, August, 2018

Toward Intelligent Machines that Augment People
CRA Snowbird Conference Panel on AI Augmenting, Not Replacing, People, July 2018

Toward Intelligent Machines that Learn to Augment People
Purdue University Industrial Engineering Distinguished Lecture Series, April, 2018

Machines Teaching People
AAAS Panel on AI for Augmenting People, February, 2018

Teaching and Learning With Robots
Nature Workshop on the Future of Robotics, Heidelberg, October 2017.

Towards Methods for Quantifying Interventional Healthcare
Max Plank Institute, March, 2017.

From Mimicry to Mastery: Creating Machines that Augment Human Skill
 Future of Robotics Symposium, Goettingen, October, 2016.

From Mimicry to Mastery: Creating Machines that Augment Human Skill
 University of California Berkeley, March, 2016.

Computational Actors in a Physical World
 AAAS Panel on Sociotechnical Systems, February, 2016

Creating Machines that Augment Human Capabilities
 ICCV Workshop on Assistive Computer Vision and Robotics, December 2015.

Computational Modeling and Enhancement of Human Skill: A Step Towards Surgery as a Data Science
 Vanderbilt University, November, 2015.

Computational Modeling and Enhancement of Human Skill: A Step Towards Surgery as a Data Science
 Armstrong Patient Safety Institute, November, 2015.

Blending People, Technology, and Algorithms into Deployable Systems for Healthcare
 5th Annual Hopkins Imaging Conference, October 2015.

Computer-assisted laparoscopy: achievements and challenges
 5th Annual Hopkins Imaging Conference, October 2015.

Computational Modeling and Enhancement of Human Skill
 University of Heidelberg, July 2015.

Building Robots To Work With People: Toward a Science of Interaction, Collaboration, and Instruction
 University of Karlsruhe, June 2015.

Modeling, Augmenting and Replicating Human Skill
 Technical University of Munich, Institute for Advanced Study, April, 2015.

Progressive Autonomy Through Apprenticeship, Observation, and Generalization
 DARPA Workshop on Autonomy, April 2015

Computer Vision for Interventional Medicine: Progress and Opportunities
 Hamlyn Center Distinguished Seminar, University College London, December 2014.

The Future of Computing Research: Enlightenment, Renaissance, or Diaspora
 USC Distinguished Lecture, November 2014.

Computational Modeling and Enhancement of Human Skill:
 Georgia Tech, October 2014.

Collaborative Computing in Interventional Medicine,
 AAAS Symposium on Collaborative Computing, February 2014.

Quantifying and Enhancing Surgical Performance,
 UT Arlington, October 2013.

Computational Modeling of Surgical Skill,
 Stanford University, June 2013.

Computational Modeling and Enhancement of Human Skill: Toward Effective Human-Machine Collaborative Systems
 Carnegie Mellon University, April 2013.

Collaborative Computing in the Physical World,
 Microsoft Research, February 2013.

From Information to Action in a World of Data, Imaged-Guided Intervention Symposium,
 Johns Hopkins University, December 2012

Computational Modeling and Enhancement of Human Skill: Toward Effective Human-Machine Collaborative Systems
 Yale University, November 2012

Quantitative Endoscopy and Interventional Medicine,
 GSISH Summer Symposium., July, 2012

Computational Modeling and Enhancement of Surgical Skill,
 Harvard IDIES Symposium., March 2012

From Information to Action: A Perspective on the Past and Future of Robotics Research and Applications,
 Western State College, Jan, 2012.

From Information to Action: A Perspective on Three Decades of Sensor-Based Robotics Research,

Challenges in Robotics: Down to Earth, DLR, Munich, Germany, Nov. 2011
From Information to Action: A Perspective on Three Decades of Sensor-Based Robotics Research,
Willow Garage, Dec. 2011
Computational Modeling and Enhancement of Surgical Skill,
Frontiers of Computer Science, Northwestern University, Oct. 2011
Video Guidance for Human-Machine Collaborative Intervention,
Workshop on Image-Guided Interventions, IROS, Oct. 2011
Tutorials on Computer Vision, Ultrasound, and Human-Machine Systems,
Dutch Institute on Systems and Control Summer School, June 2011
on Dynamics and Control Problems in Medical Robotics
Human Machine Systems for Interventional Medicine,
JHU Alumni Speaker Series, April, 2011
Computational Modeling and Enhancement of Surgical Skill,
Zurich Switzerland, ETH, February, 2011

Consultant/Expert/Corporate Leadership:

Ready Robotics, Co-founder and Advisor
Burns and Levison LLP
Morrison and Foerster LLP
Clear Guide Medical (founding CEO, Board Member and Advisor)
Strider Labs, Inc.
Smart Systems Technology
ABB Inc.
Siemens
United Technologies Research Center
Microsoft Inc.

University Service:

Co-Leader, WSE Healthcare focus area, 2018
Chair, Computer Science Head Search, 2018
Carey Business School Academic Advisory Board, 2012-present
Carey Business School Dean search committee, 2011
University Academic Council, 2009-2010
University Provost Search Committee, 2008
Founding Advisor, JHU Robotics Club, 2008-present
Director of JHU-TUM International Exchange, 2007-2015
Whiting School International Affairs Advisory Committee, 2008-2010
University Library Advisory Committee, 2003-2007

PUBLICATIONS

Journal Articles:

1. Chi Li, M. Zeeshan Zia, Quoc-Huy Tran, Xiang Yu, Gregory D. Hager and Manmohan Chandraker
Deep Supervision with Intermediate Concepts IEEE Transactions on Pattern Analysis and Machine
Intelligence (TPAMI), 2018.
2. Simon Leonard, Ayushi Sinha, Austin Reiter, Masaru Ishii, Gary L Gallia, Russell H Taylor, and
Gregory D Hager. Evaluation and stability analysis of video-based navigation system for functional
endoscopic sinus surgery on in-vivo clinical data. IEEE Transactions on Medical Imaging, 2018.

3. A Malpani, N Martinez, S Vedula, G Hager, and C Chen. Automated skill classification using time and motion efficiency metrics in vaginal cuff closure. *American Journal of Obstetrics & Gynecology*, 218(2):S891-S892, 2018.
4. Ya Wei Tseng, S Swaroop Vedula, Anand Malpani, Narges Ahmidi, Kofi DO Boahene, Ira D Papel, Theda C Kontis, Jessica Maxwell, John R Wanamaker, Patrick J Byrne, Sonya Malekzadeh, Gregory D Hager, Lisa E Ishii, Masaru Ishii. Association between surgical trainee daytime sleepiness and intraoperative technical skill when performing septoplasty. *JAMA facial plastic surgery*, 2018.
5. Narges Ahmidi, Lingling Tao, Shahin Sefati, Yixin Gao, Colin Lea, Benjamín Béjar Haro, Luca Zappella, Sanjeev Khudanpur, René Vidal, and Gregory D Hager. A dataset and benchmarks for segmentation and recognition of gestures in robotic surgery. *IEEE Transactions on Biomedical Engineering*, 64(9):2025–2041, 2017.
6. Sanjay Krishnan, Animesh Garg, Sachin Patil, Colin Lea, Gregory Hager, Pieter Abbeel, and Ken Goldberg. Transition state clustering: Unsupervised surgical trajectory segmentation for robot learning. *The International Journal of Robotics Research*, 36(13-14):1595–1618, 2017.
7. Lena Maier-Hein, Swaroop S Vedula, Stefanie Speidel, Nassir Navab, Ron Kikinis, Adrian Park, Matthias Eisenmann, Hubertus Feussner, Germain Forestier, Stamatia Giannarou, et al. Surgical data science for next-generation interventions. *Nature Biomedical Engineering*, 1(9):691, 2017.
8. S Swaroop Vedula and Gregory D Hager. Surgical data science: the new knowledge domain. *Innovative surgical sciences*, 2(3):109–121, 2017.
9. Vedula, S. Swaroop, Masaru Ishii, and Gregory D. Hager. Objective Assessment of Surgical Technical Skill and Competency in the Operating Room. *Annual Review of Biomedical Engineering* 19.1 (2017).
10. N Ahmidi, L Tao, S Sefati, Y Gao, C Lea, B Bejar, L Zappella, S Khudanpur, R Vidal, GD Hager. A Dataset and Benchmarks for Segmentation and Recognition of Gestures in Robotic Surgery. *IEEE Transactions on Biomedical Engineering*, 2017
11. Yixin Gao, S Swaroop Vedula, Gyusung I Lee, Mija R Lee, Sanjeev Khudanpur, and Gregory D Hager. Query-by-example surgical activity detection. *International journal of computer assisted radiology and surgery*, 11(6):987-996, 2016.
12. Anand Malpani, Colin Lea, Chi Chiung Grace Chen, and Gregory D Hager. System events: readily accessible features for surgical phase detection. *International journal of computer assisted radiology and surgery*, 11(6):1201-1209, 2016.
13. S Swaroop Vedula, Anand Malpani, Narges Ahmidi, Sanjeev Khudanpur, Gregory Hager, and Chi Chiung Grace Chen. Task-level vs. segment-level quantitative metrics for surgical skill assessment. *Journal of surgical education*, 73(3):482-489, 2016.
14. Swaroop Vedula, Anand O Malpani, Lingling Tao, George Chen, Yixin Gao, Piyush Poddar, Narges Ahmidi, Christopher Paxton, Rene Vidal, Sanjeev Khudanpur, et al. Analysis of the structure of surgical activity for a suturing and knot-tying task. *PloS one*, 11(3):e0149174, 2016.
15. Deshmukh, Nishikant P., Jesus J. Caban, Russell H. Taylor, Gregory D. Hager, and Emad M. Bector. “Five-dimensional ultrasound system for soft tissue visualization.” *International journal of computer assisted radiology and surgery* 10, no. 12 (2015): 1927-1939.
16. Malpani, Anand, S. Swaroop Vedula, Chi Chiung Grace Chen, and Gregory D. Hager. “A study of crowdsourced segment-level surgical skill assessment using pairwise rankings.” *International journal of computer assisted radiology and surgery* 10, no. 9 (2015): 1435-1447.

17. Ahmidi, Narges, Piyush Poddar, Jonathan D. Jones, S. Swaroop Vedula, Lisa Ishii, Gregory D. Hager, and Masaru Ishii. "Automated objective surgical skill assessment in the operating room from unstructured tool motion in septoplasty." *International journal of computer assisted radiology and surgery* 10, no. 6 (2015): 981-991.
18. Chen, C. C. G., E. Tanner, A. Malpani, S. S. Vedula, A. N. Fader, S. A. Scheib, I. C. Green, and G. D. Hager. "Warm-Up Before Robotic Hysterectomy Does Not Improve Trainee Operative Performance: A Randomized Trial." *Journal of Minimally Invasive Gynecology* 22, no. 6 (2015): S34.
19. Roncal, William R. Gray, Dean M. Kleissas, Joshua T. Vogelstein, Priya Manavalan, Kunal Lillaney, Michael Pekala, Randal Burns et al. "An automated images-to-graphs framework for high resolution connectomics." *Frontiers in neuroinformatics* 9 (2015).
20. N. P. Deshmukh, H. J. Kang, S. D. Billings, R. H. Taylor, G. D. Hager, and E. M. Boctor, Elastography Using Multi-Stream GPU: An Application to Online Tracked Ultrasound Elastography, In-Vivo and the da Vinci Surgical System *PLoS one* 9(12), e115881, 2014.
21. R. Richa, R. Linhares, E. Comunello, A. von Wangenheim, J.-Y. Schnitzler, B. Wassmer, C. Guillemot, G. Thuret, P. Gain, G. Hager, et al., Fundus image mosaicking for information augmentation in computer-assisted slit-lamp imaging *IEEE Transactions on Medical Imaging* 33(6) pp. 1304-1312, 2014.
22. D. J. Ramsey, J. S. Sunness, P. Malviya, C. Applegate, G. D. Hager, and J. T. Handa. Automated image alignment and segmentation to follow progression of geographic atrophy in age-related macular degeneration. *Retina* 34, 1296, 2014.
23. H. Rivaz, E. M. Boctor, M. A. Choti, and G. D. Hager. Ultrasound elastography using multiple images. *Medical image analysis*, 18(2):314–329, 2014.
24. E. M. Meisner, G. D. Hager, S. L. Ishman, D. Brown, D. E. Tunkel, and M. Ishii. Anatomical reconstructions of pediatric airways from endoscopic images: A pilot study of the accuracy of quantitative endoscopy. *The Laryngoscope*, 2013.
25. L. Zappella, B. Béjar, G. Hager, and R. Vidal. Surgical gesture classification from video and kinematic data. *Medical image analysis*, 2013.
26. Chaudhry, Rizwan, Gregory Hager, and Ren Vidal. "Dynamic template tracking and recognition." *International Journal of Computer Vision* 105.1:19-48, 2013.
27. Mirotta, D. J., A. Uneri, S. Schafer, S. Nithianathan, D. D. Reh, M. Ishii, G. L. Gallia, R. H. Taylor, G. D. Hager, and J. H. Siewerdsen. "Evaluation of a system for high-accuracy 3D image-based registration of endoscopic video to C-arm cone-beam CT for image-guided skull base surgery." *IEEE transactions on medical imaging* 32, no. 7: 1215, 2013.
28. Foughi, Pezhman, Hyun-Jae Kang, Daniel A. Carnegie, Mark G. van Vledder, Michael A. Choti, Gregory D. Hager, and Emad M. Boctor. "A Freehand Ultrasound Elastography System With Tracking for In Vivo Applications." *Ultrasound in Medicine & Biology* 39.2: 211-225, 2013.
29. Becker, Brian C., Robert A. MacLachlan, Louis A. Lobes Jr, Gregory D. Hager, and Cameron N. Riviere. "Vision-based control of a handheld surgical micromanipulator with virtual fixtures." *IEEE Transactions on Robotics* 29:3:674 - 683, 2013.
30. R. Sznitman, R. Richa, R. Taylor, B. Jedynek, and G. Hager. Unified detection and tracking of instruments during retinal microsurgery. *IEEE PAMI*, 35(5):1263–1273, 2013.

31. Fleming, Ioana Nicolaescu, Carmen Kut, Katarzyna J. Macura, Li-Ming Su, Hassan Rivaz, Caitlin Schneider, Ulrike Hamper et al. "Ultrasound elastography as a tool for imaging guidance during prostatectomy: Initial experience." *Medical science monitor: international medical journal of experimental and clinical research* 18, no. 11:CR635, 2012.
32. Ahmidi, Narges, Masaru Ishii, Gabor Fichtinger, Gary L. Gallia, and Gregory D. Hager. An objective and automated method for assessing surgical skill in endoscopic sinus surgery using eyetracking and toolmotion data. *International Forum of Allergy & Rhinology*. Volume 2, Issue 6, pages 507-515, 2012.
33. Richa, Rogerio, Marcin Balicki, Raphael Sznitman, Eric Meisner, Russell Taylor, and Gregory Hager. Vision-Based Proximity Detection in Retinal Surgery. *Biomedical Engineering, IEEE Transactions on* 59, no. 8: 2291-2301, 2012.
34. Mirota, Daniel J., Hanzi Wang, Russell H. Taylor, Masaru Ishii, Gary L. Gallia, and Gregory D. Hager. A system for video-based navigation for endoscopic endonasal skull base surgery. *Medical Imaging, IEEE Transactions on* 31, no. 4: 963-976, 2012.
35. Kumar, Rajesh, Amod Jog, Anand Malpani, Balazs Vagvolgyi, David Yuh, Hiep Nguyen, Gregory Hager, and Chi Chiung Grace Chen. Assessing system operation skills in robotic surgery trainees. *The International Journal of Medical Robotics and Computer Assisted Surgery* 8, no. 1: 118-124, 2012.
36. Kumar, Rajesh, Amod Jog, Balazs Vagvolgyi, Hiep Nguyen, Gregory Hager, Chi Chiung Grace Chen, and David Yuh. Objective measures for longitudinal assessment of robotic surgery training. *The Journal of thoracic and cardiovascular surgery* 143, no. 3: 528-534, 2012.
37. Rajesh Kumar, Qian Zhao, Sharmishtaa Seshamani, Gerard Mullin, Gregory D. Hager, Themistocles Dassopoulos: Assessment of Crohn's Disease Lesions in Wireless Capsule Endoscopy Images. *IEEE Trans. Biomed. Engineering* 59(2): 355-362, 2012.
38. Hager, Gregory D., and Ben Wegbreit. Scene parsing using a prior world model. *The International Journal of Robotics Research* 30.12: 1477-1507, 2011.
39. Sharmishtaa Seshamani, Rajesh Kumar, Gerard Mullin, Themistocles Dassopoulos, Gregory D. Hager: A Meta Method for Image Matching. *IEEE Trans. Med. Imaging* 30(8): 1468-1479, 2011.
40. Zachary A. Pezzementi, Erion Plaku, Caitlin Reyda, Gregory D. Hager: Tactile-Object Recognition From Appearance Information. *IEEE Transactions on Robotics* 27(3): 473-487, 2011.
41. Hassan Rivaz, Emad Boctor, Michael A. Choti, Gregory D. Hager: Real-Time Regularized Ultrasound Elastography. *IEEE Trans. Med. Imaging* 30(4): 928-945, 2011.
42. Carol E. Reiley, Henry C. Lin, David D. Yuh, Gregory D. Hager. A Review of Methods for Objective Surgical Skill Evaluation. *Surgical Endoscopy*, 25(2):356-366, 2011.
43. Raphael Sznitman, Manaswi Gupta, Gregory D. Hager, Paulo E. Arratia, and Josu Sznitman. Multi-environment model estimation for motility analysis of *caenorhabditis elegans*. *CoRR*, abs/1007.1398, 2010.
44. Hanzi Wang, Daniel Mirota, and Gregory D. Hager. A generalized kernel consensus based robust estimator. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 32(1):178-184, 2010.
45. Van Vledder, Mark G., Emad M. Boctor, Lia R. Assumpcao, Hassan Rivaz, Pezhman Foroughi, Gregory D. Hager, Ulrike M. Hamper, Timothy M. Pawlik, and Michael A. Choti. Intraoperative ultrasound elasticity imaging for monitoring of hepatic tumour thermal ablation. *HPB* 12, no. 10: 717-723, 2010.

46. Li-Ming Su, Balazs P. Vagvolgyi, Rahul Agarwal, Carol E. Reiley, Russell H. Taylor, and Gregory D. Hager. Augmented reality during robot-assisted laparoscopic partial nephrectomy: Toward real-time 3D-CD to stereoscopic video registration. *Journal of Urology*, 73(4):896-900, 2009.
47. Alexandre Krupa, Gabor Fichtinger, and Gregory D. Hager. Real-time motion stabilization with b-mode ultrasound using image speckle information and visual servoing. *International Journal of Robotics Research*, 28(10):1334-1354, 2009.
48. Jason Corso and Gregory D. Hager. Image description with features that summarize. *Computer Vision and Image Understanding*, 113, pp. 446-458, 2009.
49. Hassan Rivaz, Emad Boctor, Pezhman Foroughi, R. Zellars, Gabor Fichtinger, and Gregory D. Hager. Ultrasound elastography: A dynamic programming approach. *IEEE Trans. Med. Imaging*, 27(10):1373-1377, 2008.
50. J. Corso and D. Burschka, and G. Hager. A Practical Paradigm and Platform for Video-Based Human-Computer Interaction. *IEEE Computer*, 2008, 42(5):48-55, 2008.
51. Maneesh Dewan, Gregory D. Hager, and Christine H. Lorenz. Image-based coronary tracking and beat-to-beat motion compensation: Feasibility for improving coronary MR angiography. *Magnetic Resonance in Medicine*, 60(3):604-615, 2008.
52. Hanzi Wang, Daniel Mirota, Gregory Hager, and Masaru Ishii. Anatomical reconstruction from endoscopic images: Toward quantitative endoscopy. *American Journal of Rhinology*, 22(1):47-51, January/February 2008.
53. B. Vagvolgyi, C. Reiley, G. Hager, R. Taylor, and L.M. Su. Augmented Reality Using Registration Of 3d Computed Tomography To Stereoscopic Video Of Laparoscopic Renal Surgery. *Journal of Urology*, 179(4):241-241, 2008.
54. Henry C. Lin, Izhak Shafran, David Yuh, Gregory D. Hager. Towards Automatic Skill Evaluation: Detection and Segmentation of Robot-Assisted Surgical Motions. *Computer Aided Surgery*, 11(5):220-230, September 2006.
55. Le Lu and Xiang-tian Dai and Gregory D. Hager. Efficient particle filtering using RANSAC with application to 3D face tracking. *Image Vision Computing*, 24(6):581-592, June 2006.
56. Darius Burschka and Ming Li and Russell Taylor and Gregory D. Hager and Masaru Ishii. Scale-Invariant Registration of Monocular Endoscopic Images to CT-Scans for Sinus Surgery. *Medical Image Analysis*, 9(5):413-439, October 2005. **(Best Paper Award)**
57. Jason J. Corso and Guangqi Ye and Gregory D. Hager. Analysis of Multi-Modal Gestures with a Coherent Probabilistic Graphical Model. *Virtual Reality*, 8(4):242-252, September 2005.
58. Darius Burschka, Jason J. Corso, Maneesh Dewan, William W. Lau, Ming Li, Henry Lin, Panadda Marayong, Nicholas A. Ramey, Gregory D. Hager, Brian Hoffman, David Larkin, and Christopher J. Hasser. Navigating inner space: 3-D assistance for minimally invasive surgery . *Robotics and Autonomous System*, 52(1):5-26, 2005.
59. D. Kragic, P. Marayong, M. Li, A.M. Okamura, and G.D. Hager. Human-Machine Collaborative Systems for Microsurgical Applications. *The International Journal of Robotics Research*, 24(9):731-741, 2005.
60. Guangqi Ye, Jason J. Corso, Darius Burschka, and Gregory D. Hager. Vics: A modular hci framework using spatio-temporal dynamics. *Machine Vision and Applications*, 16(1):13-20, 2004.

61. A. Bettini, P. Marayong, S. Lang, A. M. Okamura, and G. D. Hager, Vision Assisted Control for Manipulation Using Virtual Fixtures, *IEEE Transactions on Robotics*, Vol. 20, No. 6, pp. 953-966, 2004.
62. D. Rothbaum, J. Roy, G. Hager, R. Taylor, L. Whitcomb, H. Francis, and J. Niparko. Task performance in stapedotomy: Comparison between surgeons of different experience levels. *Otolaryngology - Head and Neck Surgery*, 2003.
63. Myron Z. Brown, Darius Burschka, and Gregory D. Hager. Advances in Computational Stereo. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 25(8):993-1008, 2003.
64. Joint Probabilistic Techniques for Tracking Multi-Part Objects (with C. Rasmussen). *IEEE PAMI*, 23(6): pp. 560-576, 2001.
65. Object Pose from Video Images (with C-P. Lu and E. Mjolsness). *PAMI* 22(6): pp. 610-622, 2000
66. What Tasks Can Be Performed with an Uncalibrated Stereo Vision System? (with J. Hespanha, Z. Dodds, and A.S. Morse). The *International Journal of Computer Vision*, 35(1): pp. 65-85, Nov. 1999.
67. Incremental Focus of Attention for Robust Visual Tracking (with K. Toyama). The *International Journal of Computer Vision*, 35(1): pp. 45-63, Nov. 1999.
68. Tracking in 3D: Image Variability Decomposition for Recovering Object Pose and Illumination (with P. Belhumeur). *Pattern Analysis and Applications*, March, 1999.
69. Efficient Region Tracking with Parametric Models of Geometry and Illumination (with P. Belhumeur). *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 20(10), pp. 1125-1139, 1998.
70. The XVision System: A General-Purpose Substrate for Portable Real-Time Vision Applications (with K. Toyama). *Computer Vision and Image Understanding*, 69(1), pp. 23-37, 1998.
71. A Modular System for Robust Hand-Eye Coordination Using Feedback from Stereo Vision. *IEEE Transactions on Robotics and Automation*, 13(4) pp. 582-595, 1997.
72. A Tutorial Introduction to Visual Servo Control (with S. Hutchinson and P. Corke). *IEEE Transactions on Robotics and Automation*, 12(5) pp. 651-670, 1996 (**one of five nominated for best transactions article of 1996**).
73. Online Computation of Exterior Orientation with Application to Hand-Eye Calibration (with C.P. Lu and E. J. Mjolsness). *Mathematical and Computer Modeling*, 24(5), pp. 121-143, 1996.
74. Robot Feedback Control Based on Stereo Vision: Towards Calibration-Free Hand-Eye Coordination (with W. Chang and A.S. Morse). *IEEE Control Systems Magazine*, 15(1), pp. 30-39, 1995.
75. Task-Directed Computation of Qualitative Decisions from Sensor Data. *IEEE Transactions on Robotics and Automation*, 10(4), pp. 415-429, 1994.
76. Solving Large Systems of Non-Linear Constraints with Application to Data Modeling. *Interval Computations*, 2, pp. 169-200, 1994.
77. Real-Time Vision-Based Robot Localization (with S. Atiya). *IEEE Transactions on Robotics and Automation*, 9(6), pp. 785-800, 1993.
78. Computational Methods for Task-Directed Sensor Data Fusion and Sensor Planning (with M. Mintz). *International Journal of Robotics Research*, 10(4), pp. 285-313, 1991.

Books:

79. *Task-Directed Sensor Fusion and Planning*. Kluwer, Boston, 1990.
80. *The Confluence of Vision and Control* (with D. Kriegman, and A.S. Morse, Editors) LNCIS series, Springer-Verlag, 1998.
81. *Robust Vision for Vision-Based Control of Motion* (with M. Vincze, Editor) IEEE Computer Society Press, 1999.
82. *Sensor-Based Robots* (with H. Christensen, Editor) LNCS series, Springer-Verlag, 2001.

Book Chapters:

83. Henrik I. Christensen and Gregory D. Hager. Sensing and estimation. In Bruno Siciliano and Oussama Khatib, editors, Springer Handbook of Robotics II, pages 87-107. 2014.
84. G. D. Hager. Human-Machine Cooperative Manipulation with Vision-based Motion Constraints in Visual Servoing via Advanced Numerical Methods. Graziano Chesi and Koichi Hashimoto, editors, 2010.
85. Henrik I. Christensen and Gregory D. Hager. Sensing and estimation. In Bruno Siciliano and Oussama Khatib, editors, Springer Handbook of Robotics, pages 87-107. 2008.
86. Guangqi Ye and Jason J. Corso Gregory D. Hager. Real-Time Vision for Human-Computer Interaction, chapter 7: Visual Modeling of Dynamic Gestures Using 3D Appearance and Motion Features. Springer-Verlag, 2005.
87. Research Issues in Vision and Control (with D. Kriegman and A.S. Morse) in *The Confluence of Vision and Control* (G. Hager D. Kriegman, and A.S. Morse, Editors) LNCIS series, Springer-Verlag, 1998.
88. Feature-Based Visual Servoing and its Application to Telerobotics (with G. Grunwald and K. Toyama). In V. Graefe, editor, *Intelligent Robotic Systems*, Elsevier, Amsterdam, 1995.
89. Robust Linear Rules for Nonlinear Systems. In J.K. Aggarwal, editor, *Multisensor Fusion for Computer Vision*, Springer-Verlag, 1993.
90. Automatic Sensor Search and Positioning for Geometric Tasks (with M. Mintz). In S. Chen, editor, *Recent Advances in Spatial Reasoning*, Ablex, 1990.

Reviews, Editorials:

91. Kragic, Danica, and Gregory D. Hager. Special Issue on Robotic Vision. The International Journal of Robotics Research 31, no. 4 (2012): 379-380.
92. Computational Vision at Yale (with Peter N. Belhumeur, James S. Duncan, Drew V. McDermott, A. Stephen Morse, Steven W. Zucker) International Journal of Computer Vision 35(1): 5-12, November 1999
93. Introduction to the Special Section on Vision-Based Control of Robot Manipulators (with S. Hutchinson). *IEEE Transactions on Robotics and Automation*, 12(5) pp. 649-650, 1996.
94. A Review of *Active Vision*. *IEEE Expert*, 8(4), 1993.

Invited Articles:

95. Mirotu, Daniel J., Masaru Ishii, and Gregory D. Hager. Vision-based navigation in image-guided interventions. *Annual review of biomedical engineering* 13 (2011): 297-319.
96. P. Kazanzides, G. Fichtinger, GD Hager, AM Okamura, LL Whitcomb, and RH Taylor. Surgical and Interventional Robotics-Core Concepts, Technology, and Design. *Robotics & Automation Magazine, IEEE*, 15(2):122-130, 2008.
97. G. Fichtinger, P. Kazanzides, AM Okamura, GD Hager, LL Whitcomb, and RH Taylor. Surgical and interventional robotics: Part II. *Robotics & Automation Magazine, IEEE*, 15(3):94-102, 2008.
98. GD Hager, AM Okamura, P. Kazanzides, LL Whitcomb, G. Fichtinger, and RH Taylor. Surgical and interventional robotics: part III [Tutorial]. *Robotics & Automation Magazine, IEEE*, 15(4):84-93, 2008.
99. Darius Burschka and Gregory D. Hager. Principles and Practice of Real Time Tracking on Consumer Hardware . In Tututial 1 at IEEE VR2003: Recent Methods for Image-Based Modeling and Rendering, pages 55-66, March 2003.
100. Human-Machine Cooperative Manipulation With Vision-Based Motion Constraints, Workshop on Visual Servoing, (with IROS 2002).
101. FROB: A Transformational Approach to the Design of Robot Software (with J. Peterson), Proceedings of the Ninth International Symposium on Robotics Research, Springer Verlag, 2000, pages 257-264.
102. Tracking in 3D: Image Variability Decomposition for Recovering Object Pose and Illumination (with P. Belhumeur). In the Proceedings of the International Conference on Pattern Analysis and Applications, pp. 93-102.
103. Toward Domain-Independent Navigation: Dynamic Vision and Control, (with D. Kriegman, A. Georgiades and O. Ben-Shahar). In the proceedings of the IEEE Conference on Decision and Control, special session on active vision, 1998.
104. Vision-Based Robot Control (with P. Corke). In *Control Problems in Robotics and Automation*, Springer Verlag Lecture Notes in Control and Information Sciences 230, pp. 177-190, 1997.
105. Modeling and Control for Mobile Manipulation in Everyday Environments (with W. Feiten, W. Magnussen and K. Toyama). In the *Proceedings of the 1997 International Symposium on Robotics Research*.
106. A Projective Framework for Constructing Accurate Hand-Eye Systems (with Z. Dodds). In the *Proceedings of the IEEE/RSJ/INRIA Workshop On New Trends in Image-Based Robot Servoing*, pp. 71-82, 1997.
107. The XVision System: A Paradigm for Real-Time Vision. In *Visual Modules: Proceedings of the 19th ÖAGM and 1st SDVR Workshop*, pp. 11-28, 1995.
108. Sensor planning for reactive robot programs (with G. Grunwald). In *Proceedings of the Allerton Conference on Communications, Computing and Control*, Oct., 1992.

Peer-Reviewed Conference Publications:

109. Christian Rupprecht, Iro Laina, Nassir Navab, Gregory D Hager, and Federico Tombari. Guide me: Interacting with deep networks. Proc. CVPR, 2018.
110. A Sinha, X Liu, A Reiter, M Ishii, GD Hager, RH Taylor. Endoscopic navigation in the absence of CT imaging. Proc. Medical Image Computing and Computer-Assisted Intervention (MICCAI), 2018.
111. R DiPietro, GD Hager. Unsupervised Learning for Surgical Motion by Learning to Predict the Future. Proc. MICCAI, 2018.
112. Chi Li, Jin Bai and Gregory D. Hager. A Unified Framework for Multi-View Multi-Class Object Pose Estimation European Conference on Computer Vision (ECCV), 2018
113. Chi Li, Jonathan Bohren, and Gregory D Hager. Bridging the robot perception gap with mid-level vision. In *Robotics Research*, pages 5-20. Springer, 2018.
114. Wentao Zhu, Xiang Xiang, Trac D Tran, Gregory D Hager, and Xiaohui Xie. Adversarial deep structured nets for mass segmentation from mammograms. In *International Symposium on Biomedical Imaging (ISBI)*, pages 847-850. 2018.
115. Xiang Xiang, Ye Tian, Austin Reiter, Gregory D Hager, and Trac D Tran. S3d: Stacking segmental p3d for action quality assessment. In *2018 25th IEEE International Conference on Image Processing (ICIP)*, pages 928-932. 2018.
116. Zachary Pezzementi and Gregory D Hager. Tactile object recognition and localization using spatially-varying appearance. In *Robotics Research*, pages 201-217. Springer, 2017.
117. Cathryn S Cortesa, Jonathan D Jones, Gregory D Hager, Sanjeev Khudanpur, Amy L Shelton, and Barbara Landau. Characterizing spatial construction processes: Toward computational tools to understand cognition. In *CogSci*, 2017.
118. Chris Paxton, Vasumathi Raman, Gregory Hager, Marin Kobilarov. Combining Neural Networks and Tree Search for Task and Motion Planning in Challenging Environments, IROS, 2017.
119. Chris Paxton, Andrew Hundt, Felix Jonathan, Kelleher Guerin, and Gregory D Hager. Costar: Instructing collaborative robots with behavior trees and vision. In *Robotics and Automation (ICRA), 2017 IEEE International Conference on*, pages 564–571. IEEE, 2017.
120. Chi Li, M. Zeeshan Zia, Quoc-Huy Tran, Xiang Yu, Gregory D. Hager and Manmohan Chandraker. Deep Supervision with Shape Concepts for Occlusion-Aware 3D Object Parsing. *Computer Vision and Pattern Recognition (CVPR)*, 2017
121. Feng Wang, Xiang Xiang*, Chang Liu, Trac D. Tran, Austin Reiter, Gregory D. Hager, Jian Cheng and Alan L. Yuille. Regularizing Face Verification Nets for Pain Intensity Regression. *IEEE International Conference on Image Processing (ICIP)* 2017.
122. Colin Lea Michael D Flynn René and Vidal Austin Reiter Gregory D Hager. Temporal convolutional networks for action segmentation and detection. In *IEEE Conference on Computer Vision and Pattern Recognition*, pages 156–165, 2017.
123. Christian Rupprecht, Iro Laina, Robert DiPietro, Maximilian Baust, Federico Tombari, Nassir Navab, and Gregory D Hager. Learning in an uncertain world: Representing ambiguity through multiple hypotheses. In *International Conference on Computer Vision (ICCV)*, 2017.
124. Seth D Billings, Ayushi Sinha, Austin Reiter, Simon Leonard, Masaru Ishii, Gregory D Hager, and Russell H Taylor. Anatomically constrained video-ct registration via the v-imlop algorithm. In *International Conference on Medical Image Computing and Computer-Assisted Intervention*, pages 133-141. Springer International Publishing, 2016.

125. Jonathan Bohren, Chris Paxton, Ryan Howarth, Gregory D Hager, and Louis L Whitcomb. Semi-autonomous telerobotic assembly over high-latency networks. In *The Eleventh ACM/IEEE International Conference on Human Robot Interaction*, pages 149-156. IEEE Press, 2016.
126. Robert DiPietro, Colin Lea, Anand Malpani, Narges Ahmidi, S Swaroop Vedula, Gyusung I Lee, Mija R Lee, and Gregory D Hager. Recognizing surgical activities with recurrent neural networks. In *International Conference on Medical Image Computing and Computer-Assisted Intervention*, pages 551-558. Springer International Publishing, 2016.
127. Yixin Gao, S Swaroop Vedula, Gyusung I Lee, Mija R Lee, Sanjeev Khudanpur, and Gregory D Hager. Unsupervised surgical data alignment with application to automatic activity annotation. In *Robotics and Automation (ICRA), 2016 IEEE International Conference on*, pages 4158-4163. IEEE, 2016.
128. Colin Lea, Austin Reiter, Rene Vidal, and Gregory D Hager. Segmental spatiotemporal cnns for fine-grained action segmentation. In *European Conference on Computer Vision*, pages 36-52. Springer International Publishing, 2016.
129. Colin Lea, Rene Vidal, and Gregory D Hager. Learning convolutional action primitives from multimodal timeseries data. In *Proceedings of the IEEE international conference on robotics and automation ICRA, 2016*.
130. Chi Li, Jonathan Bohren, Eric Carlson, and Gregory D Hager. Hierarchical semantic parsing for object pose estimation in densely cluttered scenes. In *Robotics and Automation (ICRA), 2016 IEEE International Conference on*, pages 5068-5075. IEEE, 2016.
131. Chi Li, Han Xiao, Keisuke Tateno, Federico Tombari, Nassir Navab, and Gregory D Hager. Incremental scene understanding on dense slam. In *Intelligent Robots and Systems (IROS), 2016 IEEE/RSJ International Conference on*, pages 574-581. IEEE, 2016.
132. Chris Paxton, Felix Jonathan, Marin Kobilarov, and Gregory D Hager. Do what i want, not what i did: Imitation of skills by planning sequences of actions. In *Intelligent Robots and Systems (IROS), 2016 IEEE/RSJ International Conference on*, pages 3778-3785. IEEE, 2016.
133. Xiang, Xiang, Minh Dao, Gregory D. Hager, and Trac D. Tran. "Hierarchical Sparse and Collaborative Low-Rank representation for emotion recognition." In *Acoustics, Speech and Signal Processing (ICASSP), 2015 IEEE International Conference on*, pp. 3811-3815. IEEE, 2015.
134. Guerin, Kelleher R., Colin Lea, Chris Paxton, and Gregory D. Hager. "A framework for end-user instruction of a robot assistant for manufacturing." In *Robotics and Automation (ICRA), 2015 IEEE International Conference on*, pp. 6167-6174. IEEE, 2015.
135. Ghalamzan, E., M. Amir, Chris Paxton, Gregory D. Hager, and Luca Bascetta. "An incremental approach to learning generalizable robot tasks from human demonstration." In *Robotics and Automation (ICRA), 2015 IEEE International Conference on*, pp. 5616-5621. IEEE, 2015.
136. C. Li, A. Reiter, and G. D. Hager, Beyond Spatial Pooling: Fine-Grained Representation Learning in Multiple Domains, in *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition*, pp. 4913-4922, 2015.
137. Lea, Colin, Gregory D. Hager, and Rene Vidal. "An improved model for segmentation and recognition of fine-grained activities with application to surgical training tasks." In *Applications of Computer Vision (WACV), 2015 IEEE Winter Conference on*, pp. 1123-1129. IEEE, 2015.

138. Krishnan, Sanjay, Animesh Garg, Sachin Patil, Colin Lea, Gregory Hager, Pieter Abbeel, and Ken Goldberg. "Transition state clustering: Unsupervised surgical trajectory segmentation for robot learning." In International Symposium of Robotics Research. Springer STAR. 2015.
139. A. Malpani, S. S. Vedula, C. C. G. Chen, and G. D. Hager, Pairwise Comparison-Based Objective Score for Automated Skill Assessment of Segments in a Surgical Task, in *Information Processing in Computer-Assisted Interventions*, pp. 138–147, Springer International Publishing, 2014.
140. P. J. Stolka, P. Foroughi, M. Rendina, C. R. Weiss, G. D. Hager, and E. M. Boctor, Needle guidance using handheld stereo vision and projection for ultrasound-based interventions, in *Medical Image Computing and Computer-Assisted Intervention–MICCAI 2014*, pp. 684–691, Springer International Publishing, 2014.
141. K. R. Guerin, S. D. Riedel, J. Bohren, and G. D. Hager, Adjutant: A framework for flexible human-machine collaborative systems, in *Intelligent Robots and Systems (IROS 2014), 2014 IEEE/RSJ International Conference on*, pp. 1392–1399, IEEE, 2014.
142. L. Tao, L. Zappella, G. D. Hager, and R. Vidal. Surgical gesture segmentation and recognition. In *Medical Image Computing and Computer-Assisted Intervention–MICCAI 2013*, pages 339–346. Springer Berlin Heidelberg, 2013.
143. N. Ahmidi, Y. Gao, B. Béjar, S. S. Vedula, S. Khudanpur, R. Vidal, and G. D. Hager. String motif-based description of tool motion for detecting skill and gestures in robotic surgery. In *Medical Image Computing and Computer-Assisted Intervention–MICCAI 2013*, pages 26–33. Springer Berlin Heidelberg, 2013.
144. C. Li, L. Lu, G. D. Hager, J. Tang, and H. Wang. Robust object tracking in crowd dynamic scenes using explicit stereo depth. In *Computer Vision–ACCV*, pages 71–85. Springer Berlin Heidelberg, 2013.
145. Jonathan Bohren, Chavdar Papazov, Darius Burschka, Kai Krieger, Sven Parusel, Sami Haddadin, William Shepherdson, Gregory Hager, and Louis Whitcomb. A Pilot Study in Vision-Based Augmented Telemanipulation for Remote Assembly Over High-Latency Networks. In Proceedings of the IEEE International Conference on Robotics and Automation, pp. 3631-3638, 2013.
146. Ahmidi, Narges, Gregory Hager, Lisa Ishii, Gary Gallia, and Masaru Ishii. Robotic Path Planning for Surgeon Skill Evaluation in Minimally-Invasive Sinus Surgery. *Medical Image Computing and Computer-Assisted Intervention - MICCAI (2012)*: 471-478.
147. Brucker, Manuel, Simon Lonard, T. Bodenmuller, and Gregory D. Hager. Sequential scene parsing using range and intensity information. In Robotics and Automation (ICRA), 2012 IEEE International Conference on, pp. 5417-5424. IEEE, 2012.
148. Sznitman, Raphael, Karim Ali, Rogerio Richa, Russell Taylor, Gregory Hager, and Pascal Fua. Data-Driven Visual Tracking in Retinal Microsurgery. *Medical Image Computing and Computer-Assisted Intervention-MICCAI (2012)*: 568-575.
149. Richa, Rogerio, Balazs Vagvolgyi, Marcin Balicki, Gregory Hager, and Russell Taylor. Hybrid Tracking and Mosaicking for Information Augmentation in Retinal Surgery. *Medical Image Computing and Computer-Assisted Intervention-MICCAI (2012)*: 397-404.
150. Tao, Lingling, Ehsan Elhamifar, Sanjeev Khudanpur, Gregory Hager, and Ren Vidal. Sparse hidden Markov models for surgical gesture classification and skill evaluation. *Information Processing in Computer-Assisted Interventions(2012)*: 167-177.

151. Padoy, Nicolas, and Gregory D. Hager. Deformable Tracking of Textured Curvilinear Objects. In BMVC, pp. 1-11. 2012.
152. Rogrio Richa, Marcin Balicki, Eric Meisner, Raphael Sznitman, Russell H. Taylor, Gregory D. Hager: Visual Tracking of Surgical Tools for Proximity Detection in Retinal Surgery. IPCAI 2011: 55-66.
153. Raphael Sznitman, Anasuya Basu, Rogrio Richa, Jim Handa, Peter Gehlbach, Russell H. Taylor, Bruno Jedynak, Gregory D. Hager: Unified Detection and Tracking in Retinal Microsurgery. MICCAI (1) 2011: 1-8
154. Hassan Rivaz, Emad Boctor, Michael A. Choti, Gregory D. Hager: Ultrasound Elastography Using Three Images. MICCAI (1) 2011: 371-378
155. Brian C. Becker, Robert A. MacLachlan, Gregory D. Hager, Cameron N. Riviere: Handheld micromanipulation with vision-based virtual fixtures. ICRA 2011: 4127-4132
156. Nicolas Padoy, Gregory D. Hager: Human-Machine Collaborative surgery using learned models. ICRA 2011: 5285-5292.
157. Zachary A. Pezzementi, Caitlin Reyda, Gregory D. Hager: Object mapping, recognition, and localization from tactile geometry. ICRA 2011: 5942-5948.
158. Jog, Amod, Brandon Itkowitz, May Liu, S. DiMaio, G. Hager, Myriam Curet, and Rajesh Kumar. Towards integrating task information in skills assessment for dexterous tasks in surgery and simulation. In Robotics and Automation (ICRA), 2011 IEEE International Conference on, pp. 5273-5278. IEEE, 2011.
159. Richa, Rogrio, Raphael Sznitman, Russell Taylor, and Gregory Hager. Visual tracking using the sum of conditional variance. In Intelligent Robots and Systems (IROS), 2011 IEEE/RSJ International Conference on, pp. 2953-2958. IEEE, 2011.
160. Gao, Yixin, Mert Sedef, Amod Jog, Peter Peng, Michael Choti, Gregory Hager, Jeff Berkley, and Rajesh Kumar. Towards validation of robotic surgery training assessment across training platforms. In Intelligent Robots and Systems (IROS), 2011 IEEE/RSJ International Conference on, pp. 2539-2544. IEEE, 2011.
161. Padoy, Nicolas, and Gregory D. Hager. 3D thread tracking for robotic assistance in tele-surgery. In Intelligent Robots and Systems (IROS), 2011 IEEE/RSJ International Conference on, pp. 2102-2107. IEEE, 2011.
162. Zhao, Qian, Themistocles Dassopoulos, Gerard Mullin, Greg Hager, MQ-H. Meng, and Rajesh Kumar. Towards integrating temporal information in capsule endoscopy image analysis. In Engineering in Medicine and Biology Society, EMBC, 2011 Annual International Conference of the IEEE, pp. 6627-6630. IEEE, 2011.
163. Erion Plaku and Gregory D. Hager. Sampling-based motion and symbolic action planning with geometric and differential constraints. In IEEE International Conference on Robotics and Automation, Anchorage, AK, May 2010.
164. Zachary Pezzementi, Erica Jantho, Lucas Estrade, Gregory D. Hager. Characterization and Simulation of Tactile Sensors. In Haptics Symposium, pages 199-205, Waltham, MA, March 2010.
165. Carol E. Reiley, Chi Ciung Grace Chen, and Gregory D. Hager. Skill assessment for robotic surgery using statistical models: Language of surgery. American Urogynecologic Society (AUGS), 2010.

166. Carol E. Reiley, Erion Plaku, and Gregory D. Hager. Motion generation of robotic surgical tasks: Learning from expert demonstrations. In 32nd Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), Buenos Aires, Argentina, Sept 2010.
167. Pezhman Foroughi, Hassan Rivaz, Ioana N. Fleming, Gregory D. Hager, and Emad M Boctor. Tracked ultrasound elastography (true). In Medical Image Computing and Computer Integrated surgery (MICCAI), pages 9-16, 2010.
168. Pezhman Foroughi, Gregory D. Hager, Frank K. Wacker, and Emad M Boctor. Application of external tracking in ultrasound elasticity imaging. In Medical Imaging 2010: Ultrasonic Imaging, Tomography, and Therapy, page 76291B, 2010.
169. Narges Ahmidi, Gregory D. Hager, Lisa Ishii, Gabor Fichtinger, Gary L. Gallia, and Masaru Ishii. Task and skill classification from eye tracking and tool motion in minimally invasive surgery. In Medical Image Computing and Computer Integrated surgery (MICCAI), pages 295-302, 2010.
170. Sharmishtaa Seshamani, Rajesh Kumar, Themis Dassopoulos, Gerard Mullin, and Gregory D. Hager. Augmenting capsule endoscopy diagnosis: A similarity learning approach. In Medical Image Computing and Computer Integrated surgery (MICCAI), pages 454-462, 2010.
171. Elmar Mair, Gregory D. Hager, Darius Burschka, Michael Suppa, and Gerd Hirzinger. Adaptive and generic corner detection based on the accelerated segment test. In ECCV (2), pages 183-196, 2010.
172. Andre Gaschler, Darius Burschka, and Gregory D. Hager. Epipolar-based stereo tracking without explicit 3d reconstruction. In ICPR, pages 1755-1758, 2010.
173. Raphael Sznitman, Seth Billings, Diego Rother, Daniel Mirotu, Yi Yang, James Handa, Peter Gehlbach, Jin U. Kang, Gregory D. Hager, and Russell H. Taylor. Active multispectral illumination and image fusion for retinal microsurgery. In IPCAI, pages 12-22, 2010.
174. Raphael Sznitman, Diego Rother, James Handa, Peter Gehlbach, Gregory D. Hager, and Russell H. Taylor. Adaptive multispectral illumination for retinal microsurgery. In MICCAI (3), pages 465-472, 2010.
175. Hani Girgis, Benjamin Mitchell, Themistocles Dassopoulos, Gerard Mullin, and Gregory Hager. An intelligent system to detect crohn's disease inflammation in wireless capsule endoscopy videos. In Proceedings of ISBI, 2010.
176. P. Rajan, M. Canto, E. Gorospe, A. Almario, A. Kage, Ch. Winter, G. Hager, Th. Wittenberg, and Ch. Mnzenmayer. Automated diagnosis of barrett's esophagus with endoscopic images. In World Congress on Medical Physics & Biomedical Engineering 2009, pages 2189-2192. Springer, September 2009.
177. Hassan Rivaz, Pezhman Foroughi, Ioana Fleming, Richard Zellars, Emad Boctor, and Gregory D. Hager. Tracked regularized ultrasound elastography for targeting breast radiotherapy. In Medical Image Computing and Computer Assisted Intervention (MICCAI), pages 507-515, September 2009.
178. Zachary Pezzementi, Sandrine Voros, and Gregory D. Hager. Articulated Object Tracking by Rendering Consistent Appearance Parts. In International Conference on Robotics and Automation (ICRA), pages 1225-1232, May 2009.
179. Srdan Bejakovic, Rajesh Kumar, Themistocles Dassopoulos, Gerard Mullin, and Gregory Hager. Analysis of Crohn's Disease Lesions in Capsule Endoscopy Images. In International Conference on Robotics and Automation (ICRA), May 2009.

180. Brian Becker, Sandrine Voros, and Gregory D. Hager. Active guidance of a handheld micromanipulator using visual servoing. In International Conference on Robotics and Automation (ICRA), May 2009.
181. P. Foughi, G. D. Hager, and E. Bector. Robust elasticity imaging using external tracker. In IEEE International Symposium on Biomedical Imaging: from Nano to Macro, pages 209-212, 2009.
182. Balakrishnan Varadarajan, Carol E. Reiley, Henry Lin, Sanjeev Khudanpur, and Gregory Hager. Data-derived models for segmentation with application to surgical assessment and training. Medical Image Computing and Computer-Assisted Intervention -MICCAI 2009, pages 426-434, 2009.
183. Carol E. Reiley and Gregory D. Hager. Task versus subtask surgical skill evaluation of robotic minimally invasive surgery. Medical Image Computing and Computer-Assisted Intervention -MICCAI 2009, pages 435-442, 2009.
184. Daniel Mirotu, Hanzi Wang, Russell H. Taylor, Masaru Ishii, and Gregory D. Hager. Toward video-based navigation for endoscopic endonasal skull base surgery. In Guang-Zhong Yang, David Hawkes, Daniel Rueckert, Alison Noble, and Chris Taylor, editors, Medical Image Computing and Computer-Assisted Intervention - MICCAI 2009, volume 5761 of Lecture Notes in Computer Science, pages 91-99. Springer, 2009.
185. Rizwan Chaudhry, Avinash Ravichandran, Gregory D. Hager, and Ren Vidal. Histograms of oriented optical flow and binet-cauchy kernels on nonlinear dynamical systems for the recognition of human actions. In CVPR, pages 1932-1939, 2009.
186. Sharmishta Seshamani, Purnima Rajan, Rajesh Kumar, Hani Girgis, Themis Dassopoulos, Gerard Mullin, and Gregory D. Hager. A meta registration framework for lesion matching. In MICCAI (1), pages 582-589, 2009.
187. R. Kumar, P. Rajan, S. Bejakovic, S. Seshamani, G. Mullin, T. Dassopoulos, and G. Hager. Learning disease severity for capsule endoscopy images. In IEEE ISBI 2009.
188. S. Seshamani, R. Kumar, P. Rajan, S. Bejakovic, G. Mullin, T. Dassopoulos, and G. Hager. Detecting registration failure. In Proc. IEEE International Symposium of Biomedical Imaging, pages 726-729, 2009.
189. D. Abretské, D. Mirotu, G. D. Hager, and M. Ishii. Intelligent frame selection for anatomic reconstruction from endoscopic video. In IEEE Workshop on Applications of Computer Vision 2009, pages 1-5, 2009.
190. C. E. Reiley, H. C. Lin, B. Varadarajan, B. Vagvolgyi, S. Khudanpur, D. D. Yuh, and G. D. Hager. Automatic recognition of surgical motions using statistical modeling for capturing variability. In MMVR, 2008.
191. I.N. Fleming, S. Voros, B. Vagvolgyi, Z. Pezzementi, J. Handa, R. Taylor, and G.D. Hager. Intraoperative visualization of anatomical targets in retinal surgery. In Applications of Computer Vision, 2008. WACV 2008. IEEE Workshop on, pages 1-6, Jan. 2008.
192. I. N. Fleming, M. Balicki, J. Koo, I. Iordachita, B. Mitchell, J. Handa, G. Hager, and R. Taylor. Cooperative robot assistant for retinal microsurgery. In Eleventh International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI), volume 5242, pages 543-551, 2008.
193. Sandrine Voros and Gregory Hager. Towards "real-time" tool-tissue interaction detection in robotically assisted laparoscopy. In IEEE BioRob, pages 562-567, 2008.

194. P. Marayong, G.D. Hager, and A.M. Okamura. Control methods for guidance virtual fixtures in compliant human-machine interfaces. In *Intelligent Robots and Systems, 2008. IROS 2008. IEEE/RSJ International Conference on*, pages 1166-1172, 2008.
195. H. Wang, D. Mirotu, M. Ishii, and G.D. Hager. Robust Motion Estimation and Structure Recovery from Endoscopic Image Sequences With an Adaptive Scale Kernel Consensus Estimator. In *Computer Vision and Pattern Recognition, 2008. CVPR 2008. IEEE Conference on*, pages 1-7, 2008.
196. H. Rivaz, I. Fleming, L. Assumpcao, G. Fichtinger, U. Hamper, M. Choti, G. Hager, and E. Boctor. Ablation monitoring with elastography: 2D in-vivo and 3D ex-vivo studies. In *International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI)*, volume 11, page 458. *Med Image Comput Comput Assist Interv Int Conf Med Image Comput Comput Assist Interv*, 2008.
197. H. Rivaz, I. Fleming, G. Hager, and E. Boctor. Ablation monitoring with a regularized 3d elastography technique. In *IEEE Int. Ultrasonics Symposium*, 2008.
198. Vinutha Kallem, Maneesh Dewan, John Swensen, Gregory D. Hager, and Noah J. Cowan. Kernel Based Visual Servoing. Accepted for Presentation in *IEEE/RSJ International Conference on Intelligent Robots and Systems*, October 2007.
199. H. Rivaz, R. Zellars, G. Hager, G. Fichtinger, and E. Boctor. Beam steering approach for speckle characterization and out-of-plane motion estimation in real tissue. In *In Proceedings of IEEE Int. Ultrasonics Symp.*, pages 781-784, October 2007.
200. Maneesh Dewan, Christine H. Lorenz, and Gregory D. Hager. Deformable Motion Tracking of Cardiac Structures (DEMOTRACS) for Improved MR Imaging. In *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition*, June 2007.
201. Le Lu and Gregory D. Hager. A nonparametric treatment for location/segmentation based visual tracking. In *In Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition*, June 2007.
202. M. Dewan, D. Mayhew, A. Greiser, G. D. Hager and C. H. Lorenz. Image-Based Tracking of Heart Valves for Improved Motion Compensation. In *Proceedings of the International Society for Magnetic Resonance Medicine (ISMRM), 15th Scientific Meeting in Berlin, Germany (Oral Presentation)*, page 870, May 2007.
203. Zachary Pezzementi, Allison Okamura, Gregory D. Hager. Dynamic Guidance with Pseudoadmittance Virtual Fixtures. In *International Conference on Robotics and Automation (ICRA)*, pages 1761-1767, April 2007.
204. Alexandre Krupa, Gabor Fichtinger and Gregory Hager. Full Motion Tracking in Ultrasound Using Image Speckle Information and Visual Servoing. In *International Conference on Robotics and Automation (ICRA)*, pages 2458-2464, April 2007.
205. Ben Mitchell, John Koo, M.D., Iulian Iordachita, Peter Kazanzides, Ankur Kapoor, James Handa, M.D., Russell Taylor, Gregory Hager. Development and Application of a New Steady-Hand Manipulator for Retinal Surgery. In *International Conference on Robotics and Automation (ICRA)*, pages 623-629, April 2007.
206. Alexandre Krupa, Gabor Fichtinger, and Gregory D. Hager. Real-time tissue tracking with b-mode ultrasound using speckle and visual servoing. In *MICCAI*, volume 2, pages 1-8, 2007.
207. Le Lu and Gregory D. Hager. Dynamic foreground/background extraction from images and videos using random patches. In *Proc. NIPS*, pages 929-936, December 2006.

208. Maneesh Dewan and Gregory D. Hager and and Christine H. Lorenz. Robust Image-Based Motion Tracking for Coronary MR Angiography. In the 1st International Workshop on Computer Vision for Intravascular and Intracardiac Imaging (CVII), in conjunction with MICCAI 2006, pages 171-78, Oct 2006.
209. Maneesh Dewan and Gregory D. Hager. Toward Optimal Kernel-based Tracking. In Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition, 1:618-625, June 2006.
210. Maneesh Dewan and Gregory D. Hager and and Steven M. Shea and Christine H. Lorenz. Compensating for Beat-to-Beat Variation in Coronary Motion Improves Image Quality in Coronary MR. In Proceedings of the International Society for Magnetic Resonance Medicine (ISMRM), 14th Scientific Meeting in Seattle, Washington, USA, page 2159, May 2006.
211. Maneesh Dewan and Gregory D. Hager and Christine H. Lorenz. Image-Based Tracking and Prediction of Coronary Motion for Coronary MR Angiography. In Proceedings of the 9th Annual Meeting of the Society for Cardiovascular Magnetic Resonance (SCMR), January 2006.
212. E.M. Boctor, I. Iordachita, G.D. Hager and G. Fichtinger. Bootstrapped Ultrasound Calibration . Medicine Meets Virtual Reality, 2006.
213. Henry Lin, Izhak Shafran, David D. Yuh and Gregory D. Hager. Vision-Assisted Automatic Detection and Segmentation of Robot-Assisted Surgical Motions. Medicine Meets Virtual Reality, 2006.
214. Henry Lin, Maneesh Dewan, Panadda Marayong, James Handa and Gregory D. Hager. Vision-Based Human-Machine Collaborative System for Ophthalmic Micro-Surgery. Medicine Meets Virtual Reality, 2006.
215. P. Marayong, G.D. Hager and A.M. Okamura. Effect of Hand Dynamics on Virtual Fixtures for Compliant Human-Machine Interfaces. 14th Symposium on Haptic Interfaces for Virtual Environments and Teleoperator Systems, pages 109-115, 2006.
216. Henry C. Lin, Panadda Marayong, Keith Mills, Ray Karam, Peter Kazanzides, Allison Okamura, Gregory D. Hager. Portability and Applicability of Virtual Fixtures Across Medical and Manufacturing Tasks. In Proc. of International Conference on Robotics and Automation (ICRA), pages 225-230, 2006.
217. Sharmishta Seshamani, William Lau, Gregory D. Hager. Real-time Endoscopic Mosaicking. In MICCAI, pages 355-363, 2006.
218. Sharmishta Seshamani, Cameron Riviere, James T. Handa, Louis Lobes, Gregory D. Hager. Visual Measurement of Microsurgical Motion with Application to Robotic Augmentation. In Northeast Bioengineering Conference, pages 39-40, 2006.
219. E.M. Boctor, M. DeOliviera, M. Choti, R. Ghanem, R.H. Taylor, G. Hager, G. Fichtinger. Ultrasound Monitoring of Tissue Ablation via Deformation Model and Shape Priors. In Ninth International Conference on Medical Image Computing and Computer-Assisted Intervention, volume 4191, pages 405-412. Springer, 2006.
220. E.M. Boctor, I. Iordachita, G. Fichtinger, G.D. Hager. Ultrasound Self-Calibration. In Medical Imaging 2006: Visualization, Image-Guided Procedures, and Display; Kevin R. Cleary, Robert L. Galloway, Jr.; Eds., volume 6141, pages 784-795, 2006.
221. Le Lu and Gregory Hager. Dynamic Foreground/Background Extraction from Images and Video using Random Patches. In Proc. NIPS, 2006.

222. I. Iordachita, A. Kapoor, B. Mitchell, P. Kazanzides, G. Hager, J. Handa, R. Taylor. Steady-Hand Manipulator for Retinal Surgery. In MICCAI Workshop on Medical Robotics, Edited by K. Cleary, N. Hata, P. Kazanzides, pages 66-73, 2006.
223. Le Lu and Gregory D. Hager and Laurent Younes. A Three Tiered Approach for Articulated Object Action Modeling and Recognition. *Advances in Neural Information Processing Systems*, 17:841-848, July 2005.
224. Guangqi Ye, Jason J. Corso, and Gregory D. Hager. Real-Time Vision for Human-Computer Interaction, chapter 7: Visual Modeling of Dynamic Gestures Using 3D Appearance and Motion Features, pages 103-120. Springer-Verlag, 2005.
225. Le Lu and Kentaro Toyama and Gregory D. Hager. A Two Level Approach for Scene Recognition. In *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR 2005)*, 1:688-695, 2005.
226. Jason J. Corso and Gregory D. Hager. Coherent Regions for Concise and Stable Image Description. In *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR 2005)*, 2:184-190, 2005.
227. Henry C. Lin, Izhak Shafran, Todd E. Murphy, Allison M. Okamura, David D. Yuh, and Gregory D. Hager. Automatic Detection and Segmentation of Robot-Assisted Surgical Motions. In *MICCAI 2005, LNCS 3749*, pages 802-810, 2005. **Best Paper Award at MICCAI 2005.**
228. D. Burschka and G.D. Hager. Vision-Based 3D Scene Analysis for Driver Assistance. *ICRA*, 2005.
229. Joshua Leven and Darius Burschka and Rajesh Kumar and Gary Zhang and Steve Blumenkranz and Xiangtian (Donald) Dai and Mike Awad and Gregory D. Hager and Mike Marohn and Mike Choti and Christopher J. Hasser and Russell H. Taylor. DaVinci Canvas: A Telerobotic Surgical System with Integrated, Robot-Assisted, Laparoscopic Ultrasound Capability. In *MICCAI*, pages 811-818, 2005.
230. D. Burschka and G.D. Hager. Vision-based Inspection of Structural Changes respective to Pre-operative CT-Scans with Monocular Endoscope Cameras. *CURAC*, 2005.
231. E.M. Boctor, I. Iordachita, G. Fichtinger and G. Hager. Ultrasound Self-Calibration and Real-Time Quality Control for Interventions. *IEEE International Ultrasonics Symposium*, 2005.
232. E.M. Boctor, I. Iordachita, G. Fichtinger and G. Hager. Real-Time Quality Control of Tracked Ultrasound. In *MICCAI 2005, LNCS 3749*, pages 621-630, 2005.
233. Darius Burschka and Gregory D. Hager. V-GPS(SLAM): - Vision-Based Inertial System for Mobile Robots. In *Proc. of ICRA*, pages 409-415, April 2004.
234. Guangqi Ye, Jason J. Corso, and Gregory D. Hager. Gesture Recognition Using 3D Appearance and Motion Features. In *Proceedings of CVPRHCI*, 2004.
235. Jason J. Corso, Maneesh Dewan, and Gregory D. Hager. Image Segmentation Through Energy Minimization Based Subspace Fusion. In *Proceedings of 17th International Conference on Pattern Recognition (ICPR 2004)*, 2004.
236. Nicholas A. Ramey, Jason J. Corso, William W. Lau, Darius Burschka, and Gregory D. Hager. Real Time 3D Surface Tracking and Its Applications. In *Proceedings of Workshop on Real-time 3D Sensors and Their Use (at CVPR 2004)*, 2004.

237. Darius Burschka and Gregory D. Hager. Principle and Practice of Real-Time Visual Tracking for Navigation and Mapping. In IEEE Workshop on Robotic Sensing: Robotics in the Automotive Industry, ROSE, 2004. (to appear).
238. Gregory D. Hager, Maneesh Dewan, and Charles V. Stewart. Multiple Kernel Tracking with SSD. In Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR 2004), 2004.
239. Giambattista Gennari and Gregory D. Hager. Probabilistic data association methods in visual tracking of groups. In Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR 2004), 2004.
240. William W. Lau, Nicholas A. Ramey, Jason J. Corso, Nitish Thakor, and Gregory D. Hager. Stereo-Based Endoscopic Tracking of Cardiac Surface Deformation. In Proceedings of Seventh International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI), volume 2, pages 494-501, 2004.
241. Maneesh Dewan, Panadda Marayong, Allison Okamura, and Gregory D. Hager. Vision-Based Assistance for Ophthalmic Micro-Surgery. In Proceedings of Seventh International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI), volume 2, pages 49-57, 2004.
242. D. Burschka, M. Li, R.H. Taylor, and G.D. Hager. Scale-Invariant Registration of Monocular Endoscope Images to CT-Scans For Sinus Surgery. In Proceedings of Seventh International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI), volume 2, pages 413-421, 2004.
243. A. Viswanathan, E.M. Boctor, R.H. Taylor, G.D. Hager, and G. Fichtinger. Immediate Ultrasound Calibration from Two Poses and Minimal Image Processing. In Proceedings of Seventh International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI), 2004. (to appear).
244. E. Boctor, A. Viswanathan, M. Choti, R.H. Taylor, G. Fichtinger, and G.D. Hager. A Novel Closed Form Solution For Ultrasound Calibration. In Proceedings of ISBI, 2004.
245. Darius Burschka, Ming Li, Russell Taylor, and Gregory D. Hager. Scale-Invariant Registration of Monocular Stereo Images to 3D Surface Models. In Proceedings of IROS, pages 2581-2586, 2004.
246. D. Kragic, P. Marayong, M. Li, A. M. Okamura, and G. D. Hager. Human-Machine Collaborative Systems for Microsurgical Applications. In B. Siciliano, O. Khatib, and F.C.A. Groen, editors, In International Symposium on Robotics Research, October 2003.
247. D. Kragic and G. D. Hager. Task modeling and specification for modular sensory based human-machine cooperative systems. In Proceedings of IEEE/RSJ International Conference on Intelligent Robots and Systems, volume 4, pages 3192-3197, October 2003.
248. Darius Burschka and Gregory D. Hager. V-GPS - Image-Based Control for 3D Guidance Systems. In Proc. of IROS, pages 1789-1795, October 2003.
249. Darius Burschka, Jeremy Geiman, and Gregory D. Hager. Optimal Landmark Configuration for Vision-Based Control of Mobile Robots. In Proc. of International Conference on Robotics and Automation (ICRA), pages 3917-3922, September 2003.
250. Jason Corso, Darius Burschka, and Gregory D. Hager. The 4DT: Unencumbered HCI With VICs. In Proceedings of CVPRHCI, 2003.

251. Jason Corso, Darius Burschka, and Gregory D. Hager. Direct Plane Tracking in Stereo Image for Mobile Navigation. In Proceedings of International Conference on Robotics and Automation, pages 875-880, 2003.
252. Guangqi Ye, Jason Corso, Darius Burschka, and Gregory D. Hager. VICs: A Modular Vision-Based HCI Framework. In Proceedings of 3rd International Conference on Computer Vision Systems, pages 257-267, 2003.
253. Izzet Pemececi and Gregory D. Hager. Functional reactive programming as a hybrid systems framework. In Proc. ICRA, volume 1, pages 727-734, 2003.
254. P. Marayong, M. Li, A. Okamura, and G. Hager. Spatial motion constraints: Theory and demonstrations for robot guidance using virtual fixtures. In Proc. ICRA, 2003.
255. Guangqi Ye, Jason J. Corso, Gregory D. Hager, and Allison M. Okamura. VisHap: Augmented Reality Combining Haptics and Vision. In Proceedings of IEEE International Conference on Systems, Man and Cybernetics, pages 3425-3431, 2003.
2003
256. Scene Classification from Dense Disparity Maps in Indoor Environments (with D. Burschka) In Proc. ICPR, 2002. to appear.
257. Functional Reactive Robotics: An Exercise in Principled Integration of Domain-Specific Languages (with I. Pemececi, H. Nilsson, J. Peterson, and D. Burschka), to appear in Principles and Practice of Declarative Programming, 2002.
258. Stereo-Based Obstacle Avoidance in Indoor Environments with Active Sensor Re-Calibration (with D. Burschka and S. Lee), Proc. International Conference on Robotics and Automation, 2002 (to appear).
259. Specifying Behavior in C++ (with X. Dai), Proc. International Conference on Robotics and Automation, 2002 (to appear).
260. Vision Assisted Control for Manipulation Using Virtual Fixtures: Experiments at Macro and Micro Scales (with A. Bettini and A. Okamura), Proc. International Conference on Robotics and Automation, pp 3354-3361, 2002
261. Dynamic composition of tracking primitives for interactive vision-guided navigation (with D. Burschka). In SPIE's Intelligent Systems for Advanced Manufacturing, Boston, November 2001.
262. Building a Task Language for Segmentation and Recognition of User Input to Cooperative Manipulation Systems (with C.S.Hundtofte and A.M. Okamura, 10th International Symposium on Haptic Interfaces for Virtual Environment and Teleoperator Systems, pp. 225-230, 2002
263. Vision Assisted Control for Manipulation Using Virtual Fixtures (with A. Bettini and A. Okamura), in Proc. IROS, pp. 1171-1176, 2001.
264. Applications of Task-Level Augmentation For Cooperative Fine Manipulation Tasks in Surgery (with R. Kumar, A.C. Barnes, P.S. Jensen and R.H. Taylor), *Proceedings of Medical Image Computing and Computer Assisted Intervention*, 2001.
265. Performance Evaluation of a Cooperative Manipulation Microsurgical Assistant Robot Applied to Stapedotomy (with P. Berkelman, D. Rothbaum, J. Roy, S. Lang, L. Whitcomb, P.S. Jensen, E. de Juan, R. Taylor and J. Niparko), *Proceedings of Medical Image Computing and Computer Assisted Intervention*, 2001.
266. Composable Robot Controllers (with J. Peterson and A. Serjentov), Proc. CIRA, 2001.

267. FVision: A Declarative Language for Visual Tracking (with John Peterson, Paul Hudak, Alastair Reid, and Greg Hager), Proc PADL, 2001.
268. Vision-Based Control of Mobile Robots (with D. Burschka), In Proc. International Conference on Robotics and Automation, pages 1707-1713, 2001
269. An Augmentation System for Fine Manipulation, (with Rajesh Kumar and Aaron Barnes and Patrick Jensen and Russell H. Taylor), In the Proceedings of Medical Image Computing and Computer Assisted Intervention, 2000, pp. 956-965.
270. Laser-based Position Tracking and Map Generation (with D. Burschka), Laser-based Position Tracking and Map Generation. In Proceedings of RA 2000, August 2000, Hawaii, pp. 149-155
271. On Specifying and Performing Visual Tasks with Qualitative Object Models, In the International Conference on Robotics and Automation, 2000.
272. Model-based 3-D Object Tracking using Projective Invariance (with S-W Lee and B-J You). Proceedings of the International Conference on Robotics and Automation, 1999.
273. Fast 3D Boundary Computation from Occluding Contour Motion (with A. Bendiksen). Proceedings of the International Conference on Robotics and Automation, 1999.
274. Task Specification and Monitoring for Uncalibrated Hand/Eye Coordination (with Z. Dodds, J. Hespanha, and A.S. Morse). Proceedings of the International Conference on Robotics and Automation, pp. 1607-1613, 1999.
275. A Language for Declarative Robotic Programming (with J. Peterson, and P. Hudak). Proceedings of the International Conference on Robotics and Automation, pp. 1144-1151, 1999.
276. Prototyping Real-Time Vision Systems: An Experiment in DSL Design (with A. Reid, J. Peterson, and P. Hudak). Proceedings of the International Conference on Software Engineering, pp. 484-493, 1999.
277. A Hierarchical Architecture for Vision-Based Robotic Manipulation Tasks (with Z. Dodds, M. Jagersand and K. Toyama). In Proceedings of the International Conference on Vision Systems, pp. 312-330, 1999.
278. Decidability of Robot Positioning Tasks Using Stereo Vision Systems, (with J. Hespanha, Z. Dodds and A.S. Morse). In the Proceedings of the IEEE Conference on Decision and Control, 1998.
279. Joint Probabilistic Techniques for Tracking Objects Using Multiple Visual Cues (with C. Rasmussen). In the proceedings of the IEEE International Conference on Intelligent Robots and Systems, 1998.
280. Joint Probabilistic Techniques for Tracking Multi-Part Objects (with C. Rasmussen). In the proceedings of the IEEE International Conference on Computer Vision, 1998.
281. Dynamic Sensor Planning in Visual Servoing (with E. Marchand). In the proceedings of the 1998 IEEE International Conference on Robotics and Automation.
282. What Can be Done With an Uncalibrated Stereo System? (with J. Hespanha and Z. Dodds). In the proceedings of the IEEE International Conference on Robotics and Automation, 1998.
283. Task Re-Encoding in Vision-Based Control Systems (with W-C. Chang, J. P. Hespanha and A.S. Morse). In the *Proceedings of the IEEE Conference on Decision and Control*, 1997.
284. If At First You Don't Succeed (with K. Toyama). In the *Proceedings of the AAAI Conference on Artificial Intelligence*, pp. 3-9, 1997.

285. A Color Interest Operator for Landmark-based Navigation (with Z. Dodds). *Proceedings of the AAAI Conference on Artificial Intelligence*, pp. 655-660, 1997.
286. Image-based Prediction of Landmark Features for Mobile Navigation (with D. Kriegman, E. Yeh and C. Rasmussen). In the *Proceedings of the International Conference on Robotics and Automation*, pp. 1040-1046, IEEE Computer Society Press, 1997.
287. Preliminary Results on Grasping With Vision and Touch (with J. Son, R. Howe, and J. Wang). In the *Proceedings of the 1996 IEEE/RSJ International Conference on Intelligent Robots and Systems*, Nov. 1996.
288. Robot Navigation Using Image Sequences (with C. Rasmussen). In the *Proceedings of the AAAI Conference on Artificial Intelligence*, pp. 938-943, 1996.
289. Incremental Focus of Attention for Robust Visual Tracking (with K. Toyama). In the *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition*, pp. 189-195, 1996.
290. Real-Time Tracking of Image Regions With Changes in Geometry and Illumination (with P. Belhumeur). In the *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition*, pp. 403-410, 1996.
291. A Calibration-Free, Self-Adjusting Stereo Visual Control System (with W.C. Chang and A.S. Morse). In the *Proceedings of the 13th IFAC World Congress*, pp. 343-348, 1996.
292. SERVOMATIC: A Modular System for Robust Positioning Using Stereo Visual Servoing (with K. Toyama and J. Wang). In the *Proceedings of the International Conference on Robotics and Automation*, pp. 2636-2643, IEEE Computer Society Press, 1996.
293. XVision: Combining Image Warping and Geometric Constraints for Fast Visual Tracking (with K. Toyama). In the *Proceedings of the Fourth European Conference on Computer Vision (ECCV '96)*, pp. 507-517, Springer Verlag, 1996.
294. A "Robust" Convergent Visual Servoing System (with D. Kim, A. Rizzi, D. Koditschek). In *Proceedings of the International Conference on Intelligent Robots and Systems*, Vol. I, pp. 348-353, 1995.
295. The "XVision" System: A General Purpose Substrate for Real-Time Vision-Based Robotics. In *Proceedings of the Workshop on Vision for Robotics*, pp. 56-63, 1995.
296. Distraction-Proof Tracking: Keeping One's Eye on the Ball (with K. Toyama). In *Proceedings of the International Conference on Intelligent Robots and Systems*, Vol. I, pp. 354-359, 1995.
297. Calibration-Free Visual Control Using Projective Invariance. In *Proceedings of the International Conference on Computer Vision*, pp. 1009-1015, 1995.
298. Flexible Tools for Hand-Eye Coordination (with K. Toyama). Video segment appearing in the proceedings of the International Conference on Robotics and Automation, 1995.
299. Feature-Based Visual Servoing and its Application to Telerobotics (with G. Grunwald and G. Hirzinger). In *Proceedings of the 1994 IEEE/RSJ International Conference on Intelligent Robots and Systems*, pages 164-171. IEEE Computer Society Press, Sept. 1994.
300. Real-Time Feature Tracking and Projective Invariance as a Basis for Hand-Eye Coordination. In *Proc. IEEE Conference on Computer Vision and Image Processing (CVPR)*, pages 533-539. IEEE Computer Society Press, June 1994.

301. Robot Feedback Control Based on Stereo Vision: Towards Calibration-Free Hand-Eye Coordination (with W. Chang and A.S. Morse). In *Proc. IEEE Int. Conference on Robotics and Automation*, pages 2850–2856. IEEE Computer Society Press, May 1994.
302. A Vision-Based Grasping System for Unfamiliar Planar Objects (with A. Bendiksen). In *Proc. IEEE Int. Conference on Robotics and Automation*, pages 2844–2849. IEEE Computer Society Press, May 1994.
303. On Comparing Statistical and Set-Based Methods in Sensor Data Fusion (with S. Engelson and S. Atiya). In *Proceedings of the 1993 IEEE International Conference on Robotics and Automation*, pp. 1662–1667, 1993.
304. Constraint Solving Methods and Sensor-Based Decision Making. In *Proceedings of the 1992 IEEE International Conference on Robotics and Automation*, pp. 1662–1667, 1992.
305. Towards Geometric Decision Making in Unstructured Environments. *Proceedings of the International Workshop on Intelligent Robots and Systems*, pp. 1412–1417. A revised version appears in the proceedings of SPIE, Sensor Fusion IV, 1991.
306. Using Resource-Bounded Sensing in Telerobotics. In *Proceedings of the Fifth International Conference on Advanced Robotics*, pp. 199–204, 1991.
307. Real-Time Vision-Based Robot Localization (with S. Atiya). In *Proceedings of the IEEE International Conference on Robotics and Automation*, pp. 639–643, 1991.
308. A Comparison of Information-Gathering Approaches. In *Proceedings of the Symposium on Advances in Intelligent Systems*, SPIE, Boston, MA. Also appears in *Proceedings of the first International IARP Workshop on Sensor Fusion*, Toulouse, France, 1989.
309. Estimation Procedures for Robust Sensor Control (with M. Mintz). In L. Kanal, T. Levitt, and J. Lemmer, editors, *Uncertainty in Artificial Intelligence 3*, pp. 285–301, North-Holland, New York, NY, 1989.
310. Sensor Modeling and Robust Sensor Fusion (with M. Mintz). In *Proceedings of the Fifth International Symposium on Robotics Research*, MIT Press, Cambridge, MA, 1989.
311. Task-Directed Multi-Sensor Fusion (with M. Mintz). In *Proceedings of IEEE Conference on Robotics and Automation*, pp. 662–667, 1989.
312. Egomotion and the Stabilized World (with D. Heeger). In *Proceedings of the Second International Conference on Computer Vision*, 1988.
313. Information and Multi-Sensor Coordination, (with H. Durrant-Whyte). In J. Lemmer and L. Kanal, editors, *Uncertainty in Artificial Intelligence 2*, pp. 381–394, North-Holland, New York, NY, 1988.
314. Explaining Modal Logic Proofs (with A. Felty). In *Proceedings of IEEE Systems, Man, and Cybernetics Conference on Human Computer Interaction*, 1988.
315. Searching for Information (with M. Mintz). In *Proceedings of Workshop on Spatial Reasoning and Multi-Sensor Fusion*, pp. 313–322, Morgan Kaufmann, 1987.
316. Tactile Information Processing— The Bottom Up Approach (with R. Bajcsy). In *Proceedings of the International Conference on Pattern Recognition* pp. 809–811, 1984.

Other Peer-Reviewed Conferences and Workshops:

317. Gregory D Hager, Russell H Taylor, and Austin Reiter. Self-supervised learning for dense depth estimation in monocular endoscopy. In *OR 2.0 Context-Aware Operating Theaters, Computer Assisted Robotic Endoscopy, CARE 2018, MICCAI 2018 (Best Paper Award)*.
318. Tae Soo Kim, Anand Malpani, Austin Reiter, Gregory D Hager, Shameema Sikder, and S Swaroop Vedula. Crowdsourcing annotation of surgical instruments in videos of cataract surgery. In *Intravascular Imaging and Comcoputer Assisted Stenting and Large-Scale Annotation of Biomedical Data and Expert Label Synthesis*, pages 121130. Springer, 2018.
319. Robert DiPietro, Christian Rupprecht, Nassir Navab, and Gregory D Hager. Analyzing and exploiting narx recurrent neural networks for long-term dependencies. *ICLR workshop*. Appears as arXiv preprint arXiv:1702.07805, 2017.
320. Ayushi Sinha, Austin Reiter, Simon Leonard, Masaru Ishii, Gregory D Hager, and Russell H Taylor. Simultaneous segmentation and correspondence improvement using statistical modes. In *Medical Imaging 2017: Image Processing*, volume 10133, page 101331B. International Society for Optics and Photonics, 2017.
321. Colin Lea, Rene Vidal, Austin Reiter, and Gregory D Hager. Temporal convolutional networks: A unified approach to action segmentation. In *ECCV 2016 Workshop on Activity Recognition*, pages 47-54. Springer International Publishing, 2016.
322. Simon Leonard, Austin Reiter, Ayushi Sinha, Masaru Ishii, Russell H Taylor, and Gregory D Hager. Image-based navigation for functional endoscopic sinus surgery using structure from motion. In *SPIE Medical Imaging*, pages 97840V-97840V. International Society for Optics and Photonics, 2016.
323. A Reiter, S Leonard, A Sinha, M Ishii, RH Taylor, and GD Hager. Endoscopic-CT: learning- based photometric reconstruction for endoscopic sinus surgery. In *SPIE Medical Imaging*, pages 978418-978418. International Society for Optics and Photonics, 2016.
324. Ayushi Sinha, Simon Leonard, Austin Reiter, Masaru Ishii, Russell H Taylor, and Gregory D Hager. Automatic segmentation and statistical shape modeling of the paranasal sinuses to estimate natural variations. In *SPIE Medical Imaging*, pages 97840D-97840D. International Society for Optics and Photonics, 2016.
325. Christian Rupprecht, Colin Lea, Federico Tombari, Nassir Navab, and Gregory D Hager. Sensor substitution for video-based action recognition. In *Intelligent Robots and Systems (IROS), 2016 IEEE/RSJ International Conference on*, pages 5230-5237. IEEE, 2016.
326. Y. Otake, S. Leonard, A. Reiter, P. Rajan, J. Siewerdsen, M. Ishii, R. Taylor, and G. Hager, Rendering-based video-CT registration with physical constraints for image-guided endoscopic sinus surgery, in *SPIE Medical Imaging*, pp. 94150A-94150A, 2015.
327. I. Fleming, G. Hager, X. Guo, H. J. Kang, and E. Boctor, Iterative motion compensation approach for ultrasonic thermal imaging, in *SPIE Medical Imaging*, pp. 94190Z-94190Z, 2015.
328. X. Xiang, D. Mirota, A. Reiter, and G. D. Hager, Is Multi-model Feature Matching Better for Endoscopic Motion Estimation?, in *Workshop on Computer-Assisted and Robotic Endoscopy*, pp. 88-98, Springer International Publishing, 2014.
329. Lea, Colin, James Facker, Gregory Hager, Russell Taylor, and Suchi Saria. 3D Sensing Algorithms Towards Building an Intelligent Intensive Care Unit. *AMIA Summits on Translational Science Proceedings 2013 (2013)*: 136.

330. Bergen, Tobias, Thomas Wittenberg, Christian Mnzenmayer, Chi Chiung Grace Chen, and Gregory D. Hager. A graph-based approach for local and global panorama imaging in cystoscopy. In SPIE Medical Imaging, pp. 86711K-86711K. International Society for Optics and Photonics, 2013.
331. C. Guillemot, R. Richa, E. Comunello, A. Von Wangenheim, J. Schnitzler, B. Wassmer, G. Hager, R. Taylor, G. Thuret, And P. Gain. Live retinal image mosaicking during fundus examination with a computer-assisted slit-lamp prototype. *Acta Ophthalmologica*, 91(s252):0–0, 2013.
332. Liu, Wen P., Daniel J. Mirota, Ali Uneri, Yoshito Otake, Gregory Hager, Douglas D. Reh, Masaru Ishii, Gary L. Gallia, and Jeffrey H. Siewerdsen. A clinical pilot study of a modular video-CT augmentation system for image-guided skull base surgery. Proc. SPIE Medical Imaging 2012: Image-Guided Procedures, Robotic Interventions, and Modeling 8316 (2012).
333. Wang, Xiang L., Philipp J. Stolka, Emad Boctor, Gregory Hager, and Michael Choti. The Kinect as an interventional tracking system. In SPIE Medical Imaging, pp. 83160U-83160U. International Society for Optics and Photonics, 2012.
334. Fleming, Ioana, Hassan Rivaz, Emad Boctor, and Gregory Hager. Robust dynamic programming method for ultrasound elastography. In SPIE Medical Imaging, pp. 83201K-83201K. International Society for Optics and Photonics, 2012.
335. Foroughi, Pezhman, Jessica Burgner, Michael A. Choti, Robert J. Webster III, Gregory D. Hager, and Emad M. Boctor. Towards intra-operative monitoring of ablation using tracked 3D ultrasound elastography and internal palpation. In Proceedings of SPIE, vol. 8320, p. 83200T. 2012.
336. Tokgozoglu, Haluk N., Eric M. Meisner, Michael Kazhdan, and Gregory D. Hager. Color-based hybrid reconstruction for endoscopy. In Computer Vision and Pattern Recognition Workshops (CVPRW), 2012 IEEE Computer Society Conference on, pp. 8-15. IEEE, 2012.
337. Bodenstedt, Sebastian, Nicolas Padoy, and Gregory Hager. Learned Partial Automation for Shared Control in Tele-Robotic Manipulation. In 2012 AAAI Fall Symposium Series. 2012.
338. Colin S Lea, James C Fackler, Gregory D Hager, Russell H Taylor. Towards automated activity recognition in an intensive care unit MICCAI Workshop on Modeling and Monitoring of Computer Assisted Interventions, pp. 19-28, 2012.
339. Bohren, Jonathan, Kelleher Guerin, Tian Xia, Gregory D. Hager, Peter Kazanzides, and Louis L. Whitcomb. Toward practical semi-autonomous teleoperation: Do what i intend, not what i do. In Advanced Robotics and its Social Impacts (ARSO), 2011 IEEE Workshop on, pp. 20-23. IEEE, 2011.
340. Stolka, Philipp J., Xiang Linda Wang, Gregory D. Hager, and Emad M. Boctor. Navigation with local sensors in handheld 3D ultrasound: initial in-vivo experience. In SPIE Medical Imaging, pp. 79681J-79681J. International Society for Optics and Photonics, 2011.
341. Sefati, Shahin, Hassan Rivaz, Emad Boctor, and Gregory Hager. Ultrasound elastography using regularized phase-zero cost function initialized with dynamic programming. In SPIE Medical Imaging, pp. 79681D-79681D. International Society for Optics and Photonics, 2011.
342. Ali Uneri, Sebastian Schafer, Daniel Mirota, Sajendra Nithiananthan, Yoshito Otake, Sureerat Reaungamornrat, Jongheun Yoo, Webster Stayman, Douglas D. Reh, Gary L. Gallia, Jay Khanna, Gregory D. Hager, Russell H. Taylor, Gerhard Kleinszig, and Jeffrey H. Siewerdsen. Architecture of a high-performance surgical guidance system based on c-arm cone-beam ct: software platform for technical integration and clinical translation. In Medical Imaging 2011: Visualization, Image-guided Procedures and Modeling. Proceedings of the SPIE, volume 7964. SPIE, February 2011.

343. Daniel Mirota, Ali Uneri, Sebastian Schafer, Sajendra Nithiananthan, Douglas D. Reh, Gary L. Gallia, Russell H. Taylor, Gregory D. Hager, and Jeffrey H. Siewerdsen. High-accuracy 3d image-based registration of endoscopic video to c-arm cone-beam ct for image-guided skull-base surgery. In *Medical Imaging 2011: Visualization, Image-guided Procedures and Modeling*. Proceedings of the SPIE, volume 7964. SPIE, February 2011.
344. H. Rivaz, H. Kang, P. Stolka, G. Hager, and E. Boctor. Novel reconstruction and feature exploitation techniques for sensorless freehand 3d ultrasound. In *SPIE Med. Imag.*, pages 76291D1-76291D9, 2010.
345. H. Rivaz, A. Kapoor, I Fleming, G. Hager, and E. Boctor. A novel method for monitoring liver ablation using ultrasound elastography. In *SPIE Med. Imag.*, pages 7629131-7629138, 2010.
346. Nishikant Deshmukh, Hassan Rivaz, Philipp J. Stolka, Hyun-Jae Kang, Gregory D. Hager, Mohamad E. Alaf, and Emad M. Boctor. Real-time gpu-based analytic minimization/dynamic programming elastography. In *HP-MICCAI*, 2010.
347. NP Deshmukh, H Rivaz, PJ Stolka, H Kang, GD Hager, ME Alaf, and EM Boctor. Real-time graphics processing unit-based ultrasound elastography. In *Proceedings of the Ninth International Conference on the Ultrasonic Measurement and Imaging of Tissue Elasticity*, 2010.
348. H Rivaz, U Hamper, M Choti, GD Hager, and EM Boctor. Monitoring ablative therapy using ultrasound elastography: Clinical results. In *Proceedings of the Ninth International Conference on the Ultrasonic Measurement and Imaging of Tissue Elasticity*, 2010.
349. H Rivaz, EM Boctor, and GD Hager. Robust real-time regularized ultrasound elastography. In *Proceedings of the Ninth International Conference on the Ultrasonic Measurement and Imaging of Tissue Elasticity*, 2010.
350. H. Girgis, T. Dassopoulos, G. E. Mullin, R. Kumar, and G. Hager. Computer automated severity assessment of crohn’s disease (cd) lesions in wireless capsule endoscopy (ce) images, 2010. *Digestive Disease Week* (poster).
351. P. Foughi, C. Csoma, H. Rivaz, G. Fichtinger, R. Zellars, G. D. Hager, and E. Boctor. Multi-modality fusion of CT, 3D ultrasound, and tracked strain images for breast irradiation planning. In *SPIE medical imaging: Ultrasonic Imaging and Signal Processing*, volume 7265, page 72651B, 2009.
352. S. Seshamani, M. D. Smith, J. J. Corso, M. O. Filipovich, A. Natarajan, and G. D. Hager. Direct Global Adjustment Methods for Endoscopic Mosaicking. In *Proc. SPIE Conf. on Medical Imaging*, page 72611D, 2009.
353. Daniel Mirota, Russell H. Taylor, Masaru Ishii, and Gregory D. Hager. Direct endoscopic video registration for sinus surgery. In *Medical Imaging 2009: Visualization, Image-guided Procedures and Modeling*. Proceedings of the SPIE, volume 7261, February 2009.
354. Ioana N. Fleming, Hassan Rivaz, Katarzyna Macura, Li-Ming Su, Ulrike Hamper, Tamara Lotan, Gwen Lagoda, Arthur Burnett, Russell H. Taylor, Gregory D. Hager, and Emad M. Boctor. Ultrasound elastography: enabling technology for image guided laparoscopic prostatectomy. In *Medical Imaging 2009: Visualization, Image-guided Procedures and Modeling*. Proceedings of the SPIE, volume 7261, pages 7261-7273, January 2009.
355. Helmuth Radrich, Nicolas Padoy, Ahmad Ahmadi, Hubertus Feussner, Greg Hager, Darius Burschka, and Alois Knoll. Synchronized multimodal recording system for laparoscopic minimally invasive surgeries. In *MICCAI-2009 Workshop on Modeling and Monitoring of Computer Assisted Interventions (M2CAI)*, September 2009.

356. T. Dassopoulos, R. Kumar, S. Bejakovic, P. Rajan, S. Seshamani, G. Mullin, and G. Hager. Automated detection and assessment of crohn's disease lesions in images from wireless capsule endoscopy. In Digestive Disease Week 2009.
357. R. Sznitman, H. Lin, M. Gupta, and G. D. Hager. Active Background Modeling: Actors on a Stage. In Proc. International Conference on Computer Vision, Workshop on Visual Surveillance, 2009.
358. H. Rivaz, E. Boctor, and G. Fichtinger. A robust meshing and calibration approach for sensorless freehand 3d ultrasound. In Proceedings of SPIE Medical Imaging, volume 6583, pages 181-188, February 2007.
359. Gregory Hager, Balazs Vagvolgyi and David Yuh. Stereoscopic Video Overlay with Deformable Registration. Medicine Meets Virtual Reality, 2007.
360. B. Vagvolgyi, C. E. Reiley, G. D. Hager, A. W. Levinson, and L. Su. Toward direct registration of video to computed tomography for intraoperative surgical planning during laparoscopic partial nephrectomy. In World Congress of Endourology, 2007.
361. R. Kon, J. Leven, K. Kothapalli, E.M. Boctor, G. Fichtinger, G.D. Hager and R.H. Taylor. CIS-UltraCal: An Open-Source Ultrasound Calibration Toolkit. In William F. Walker, Stanislav Y. Emelianov, editor, SPIE Medical Imaging 2005: Ultrasonic Imaging and Signal Processing, volume 5750, pages 516-523, 2005.
362. E.M. Boctor, I. Iordachita, G. Fichtinger, G.D. Hager. Bootstrapped Ultrasound Calibration. In Stud Health Technol Inform., volume 119, pages 61-6, 2005.
363. Tracker fusion for robustness in visual feature tracking (with K. Toyama). In *SPIE Int'l Sym. Intel. Sys. and Adv. Manufacturing*, volume 2589, Philadelphia, PA, October 1995.
364. Towards task-directed planning of cooperating sensors (with G. Grunwald). In *SPIE Sensor Fusion V*, pages 214-225, Nov., 1992.
365. A constraint-based view of selective perception. In *AAAI Spring Symposium on Selective Perception*, pp. 61-65, 1992.
366. Set-based estimation: Towards task-directed sensing. In *Proceedings of Melecon Conference*, pp. 1205-1209, 1991.
367. Deciding not to decide using resource-bounded sensing. In *Proceedings of the Symposium on Advances in Intelligent Systems*, SPIE, Boston, MA, 1990.

Peer-reviewed Abstracts

368. Yi PH, Kim TK, Wei J, Shin J, Kim T, Hager GD, Sair H, Fritz J. Deep Learning-Based Identification Of Traditional Hip, Knee, and Shoulder Arthroplasty and Application to Alternative Arthroplasty Designs. Clinical Abstract Poster presentation, Machine Learning for Healthcare 2018, Stanford, CA.
369. Kim TK, YiPH, Wei J, Shin J, Kim T, Hager GD, Fritz J, Sair H. External Application of Deep Convolutional Neural Networks Trained on Radiographs to Cross-Sectional Imaging in the Spine: Applications for Semantic Labeling. Clinical Abstract Poster presentation, Machine Learning for Healthcare 2018, Stanford, CA.

White Papers and Reports for Government

370. Gregory D Hager, Randal Bryant, Eric Horvitz, Maja Mataric, and Vasant Honavar. Advances in artificial intelligence require progress across all of computer science. arXiv preprint arXiv:1707.04352, 2017.
371. Elizabeth Mynatt, Gregory D Hager, Santosh Kumar, Ming Lin, Shwetak Patel, Jack Stankovic, and Helen Wright. Research opportunities and visions for smart and pervasive health. arXiv preprint arXiv:1706.09372, 2017.
372. Susan Graham and Greg Hager, (Co-Chairs), William Dally, Eric Horvitz, Sara Kiesler, Michael McQuade, Eric Schmidt. (2015). Report to the President and Congress Ensuring Leadership in Federally Funded Research and Development. Available at https://www.whitehouse.gov/sites/default/files/microsites/ostp/PCAST/nitrdr_report_aug_2015.pdf
373. Rajeev Alur, Emery Berger, Ann W. Drobni, Limor Fix, Kevin Fu, Gregory D. Hager, Daniel Lopresti, Klara Nahrstedt, Elizabeth Mynatt, Shwetak Patel, Jennifer Rexford, John A. Stankovic, and Benjamin Zorn (2015). System Computing Challenges in the Internet of Things: A white paper prepared for the Computing Community Consortium committee of the Computing Research Association. <http://cra.org/ccc/resources/ccc-led-whitepapers/>
374. Hager G. D., Hill M. D., and Yelick K. (2015). Opportunities and Challenges for Next Generation Computing: A white paper prepared for the Computing Community Consortium committee of the Computing Research Association. <http://cra.org/ccc/resources/ccc-led-whitepapers/>
375. Corso J. C., Alahi A., Grauman K., Hager G. D., Morency L., Sawhney H., and Sheikh Y. (2015). Video Analysis for Body-worn Cameras in Law Enforcement: A white paper prepared for the Computing Community Consortium committee of the Computing Research Association. <http://cra.org/ccc/resources/ccc-led-whitepapers/>
376. Hager G. D., Rus D., Kumar V., and Christensen H. (2015). Toward a Science of Autonomy for Physical Systems: A white paper prepared for the Computing Community Consortium committee of the Computing Research Association. <http://cra.org/ccc/resources/ccc-led-whitepapers/>
377. Hager G. D. and Horvitz E. (2015). Toward a Science of Autonomy for Physical Systems: Healthcare: A white paper prepared for the Computing Community Consortium committee of the Computing Research Association. <http://cra.org/ccc/resources/ccc-led-whitepapers/>
378. Abbeel P., Goldberg K., Hager G., and Shah J. (2015). Toward a Science of Autonomy for Physical Systems: Paths Toward Autonomy: A white paper prepared for the Computing Community Consortium committee of the Computing Research Association. <http://cra.org/ccc/resources/ccc-led-whitepapers/>
379. Polina Golland, Jack Gallant, Greg Hager, Hanspeter Pfister, Christos Papadimitriou, Stefan Schaal, Joshua T. Vogelstein. (2015). A New Age of Computing and the Brain. A workshop report prepared for the Computing Community Consortium committee of the Computing Research Association. <http://cra.org/ccc/wp-content/uploads/sites/2/2014/12/BRAIN-Report.pdf>

Other Publications:

380. Chris Paxton, Felix Jonathan, Andrew Hundt, Bilge Mutlu, and Gregory D Hager. Evaluating methods for end-user creation of robot task plans. arXiv preprint arXiv:1811.02690, 2018.
381. Felix Jonathan, Chris Paxton, and Gregory D Hager. Temporal and physical reasoning for perception-based robotic manipulation. *arXiv preprint arXiv:1710.03948*, 2017.

382. Lena Maier-Hein, Swaroop Vedula, Stefanie Speidel, Nassir Navab, Ron Kikinis, Adrian Park, Matthias Eisenmann, Hubertus Feussner, Germain Forestier, Stamatia Giannarou, et al. Surgical data science: enabling next-generation surgery. *arXiv preprint arXiv:1701.06482*, 2017.
383. Chris Paxton, Felix Jonathan, Andrew Hundt, Bilge Mutlu, and Gregory D Hager. User experience of the costar system for instruction of collaborative robots. *arXiv preprint arXiv:1703.07890*, 2017.
384. Chris Paxton, Kapil Katyal, Christian Rupprecht, Raman Arora, and Gregory D Hager. Learning to imagine manipulation goals for robot task planning. *arXiv preprint arXiv:1711.02783*, 2017.
385. Chris Paxton, Vasumathi Raman, Gregory D Hager, and Marin Kobilarov. Combining neural networks and tree search for task and motion planning in challenging environments. *arXiv preprint arXiv:1703.07887*, 2017.
386. Anand Malpani, S Swaroop Vedula, Henry C Lin, Gregory D Hager, and Russell H Taylor. Real-time teaching cues for automated surgical coaching. *arXiv preprint arXiv:1704.07436*, 2017.
387. Feng Wang, Xiang Xiang, Chang Liu, Trac D Tran, Austin Reiter, Gregory D Hager, Harry Quon, Jian Cheng, and Alan L Yuille. Transferring face verification nets to pain and expression regression. *arXiv preprint arXiv:1702.06925*, 2017.
388. Wentao Zhu, Xiang Xiang, Trac D Tran, Gregory D Hager, and Xiaohui Xie. Adversarial deep structured nets for mass segmentation from mammograms. *arXiv preprint arXiv:1710.09288*, 2017.
389. William Gray Roncal, Colin Lea, Akira Baruah, and Gregory D Hager. Santiago: Spine association for neuron topology improvement and graph optimization. *arXiv preprint arXiv:1608.02307*, 2016.
390. Jason J. Corso, Maneesh Dewan, and Gregory D. Hager. Image Segmentation Through Energy Minimization Based Subspace Fusion. Technical Report CIRL-TR-04-01, The Johns Hopkins University, 2004.
391. Guangqi Ye, Jason J. Corso, Gregory D. Hager, and Allison M. Okamura. Augmented Reality Combining Haptics and Vision. Technical Report 03, The Johns Hopkins University, 2003. CIRL Technical Report.
392. Jason J. Corso, Nicholas Ramey, and Gregory D. Hager. Stereo-Based Direct Surface Tracking with Deformable Parametric Models. Technical Report 02, The Johns Hopkins University, 2003. CIRL Technical Report.
393. Le Lu, Xiangtian Dai, and Gregory D. Hager. Real Time Video Mosaicing - Technical Report. Technical report, The Johns Hopkins University, 2003. CIRL Technical Report.
394. Myron Z. Brown, Darius Burschka, and Gregory D. Hager. Shape and appearance in object recognition. 2003.
395. Tracking Objects by Color Alone (with Christopher Rasmussen), DCS-RR-1114, Yale University, New Haven, CT, 1997.
396. Tracking Tools for Vision-Based Navigation, DCS-RR-1060, Yale University, New Haven, CT, 1994.
397. Six DOF Visual Control of Relative Position, DCS-RR-1038, Yale University, New Haven, CT, 1994
398. A Framework for Real-Time Vision-Based Tracking Using Off-the-Shelf Hardware (with S. Puri and K. Toyama), DCS-RR-988, Yale University, New Haven, CT, 1993.
399. A C++ Interval and Constraint Solving Package, DCS-RR-953, Yale University, New Haven, CT, 1993.

400. Some Problems in Adaptive Visual Servoing, DCS-RR-948, Yale University, New Haven, CT, 1993.
401. Active Reduction of Uncertainty in Multi-Sensor Systems. Ph.D. thesis, University of Pennsylvania, 1988.
402. An Agent Specification Language, MS-CIS-87-08, The University of Pennsylvania, Philadelphia, PA, 1987.
403. Information Maps for Active Sensor Control, MS-CIS-87-07, The University of Pennsylvania, Philadelphia, PA, 1987.
404. Commonsense Summer: The Final Report (with J. Hobbs *et al.*), CSLI-85-35, SRI International, Palo Alto, CA, 1985.
405. Computational aspects of proof theory in modal logic. Masters thesis, University of Pennsylvania, 1985

Software Packages:

1. The XVision Tracking Toolkit, 1995, 1996, 1997.
2. A System for Solution of High-Dimensional Nonlinear Constraints, 1993.

Patents and Patent Applications

1. Philipp J Stolka, Ehsan Basafa, Pezhman Foroughi, Gregory D Hager, and Emad M Boctor. System and method for fused image based navigation with late marker placement, May 22 2018. US Patent 9,978,141.
2. Marcin A Balicki, Russell H Taylor, Gregory D Hager, Peter L Gehlbach, James T Handa, and Rajesh Kumar. Visual tracking and annotaton of clinically important anatomical landmarks for surgical interventions, November 14 2017. US Patent 9,814,392.
3. Philipp Jakob Stolka, Pezhman Foroughi, Matthew C Rendina, Gregory Donald Hager, and Emad Mikhail Boctor. Surgical needle for a surgical system with optical recognition, June 6 2017. US Patent 9,668,819.
4. Carol E Reiley, Gregory D Hager, Balakrishnan Varadarajann, Sanjeev Pralhad Khudanpur, Rajesh Kumar, and Henry C Lin. Systems for quantifying clinical skill, June 27 2017. US Patent 9,691,290.
5. Philipp Jakob Stolka, Pezhman Foroughi, Matthew C Rendina, and Gregory Donald Hager. System and devices for image targeting, December 19 2017. US Patent 9,844,360.
6. Philipp Jakob Stolka, Pezhman Foroughi, Matthew C Rendina, Gregory Donald Hager, and Emad Mikhail Boctor. Ultrasound system with stereo image guidance or tracking, April 18 2017. US Patent 9,622,720.
7. Pezhman Foroughi, Emad Boctor, and Gregory Hager. Methods and apparatus for ultrasound strain imaging, April 4 2017. US Patent 9,610,063.
8. Kelleher Guerin and Gregory Hager. Generation of robotic user interface responsive to connection of peripherals to robot, May 4 2017. US Patent App. 15/342,053.
9. Kelleher Guerin and Gregory Hager. Method, device, and computer-readable medium for mobile device management of collaborative industrial robot, May 4 2017. US Patent App. 15/341,136.

10. Kelleher Guerin and Gregory D Hager. Robot control, training and collaboration in an immersive virtual reality environment, May 9 2017. US Patent 9,643,314.
11. Kelleher Guerin, Gregory D Hager, and Sebastian Riedel. System and method for flexible human-machine collaboration, March 7 2017. US Patent 9,586,315.
12. Gregory D Hager and Nicolas Padoy. System and method for detecting and tracking a curvilinear object in a three-dimensional space, May 16 2017. US Patent 9,652,682.
13. Hager, Gregory D., et al. "Imaging system and method for use of same to determine metric scale of imaged bodily anatomy." U.S. Patent No. 9,367,914. 14 Jun. 2016.
14. Hager, Gregory, and Nicolas Padoy. "Human-machine collaborative robotic systems." U.S. Patent No. 9,283,675. 15 Mar. 2016.
15. Hager, Gregory Donald, and Nicolas Padoy. "System and method for detecting and tracking a curvilinear object in a three-dimensional space." U.S. Patent No. 9,449,241. 20 Sep. 2016.
16. Taylor, R.H., Billings, S.D., Gehlbach, P.L., Hager, G.D., Handa, J.T., Kang, J.U., Vagvolgyi, B., Sznitman, R. and Pezzementi, Z., Programmable multispectral illumination system for surgery and visualization of light-sensitive tissues. U.S. Patent 9,320,428, 2016.
17. Stolka, Philipp Jakob, Ehsan Basafa, Pezhman Foroughi, Gregory Donald Hager, and Emad Mikhail Boctor. "System and method for fused image based navigation with late marker placement." U.S. Patent 9,436,993, issued September 6, 2016.
18. Guerin, Kelleher, Gregory D. Hager, and Sebastian Riedel. "System and method for flexible human-machine collaboration." U.S. Patent No. 9,272,418. 1 Mar. 2016.
19. Hager, Gregory D., Carol E. Reiley, Balakrishnan Varadarajann, Sanjeev Pralhad Khudanpur, Henry C. Lin, and Rajesh Kumar. "Systems and methods for training one or more training users." U.S. Patent 9,196,176, issued November 24, 2015.
20. Stolka, Philipp Jakob, Pezhman Foroughi, Matthew C. Rendina, Gregory Donald Hager, and Emad Mikhail Boctor. "Surgical needle for a surgical system with optical recognition." U.S. Patent 8,880,151, issued November 4, 2014.
21. Rivaz, Hassan, Gregory Hager, Emad M. Boctor, and Ioana Fleming. "Method and system for processing ultrasound data." U.S. Patent 8,824,762, issued September 2, 2014.
22. Rivaz, Hassan, Emad Moussa Boctor, Gabor Fichtinger, and Gregory Hager. "Robust and accurate freehand 3D ultrasound." U.S. Patent 8,559,685, issued October 15, 2013.
23. E. Boctor, G. Hager, D. Heisenberg, and P. Stolka. Interventional in-situ image-guidance by fusing ultrasound and video, Apr. 19 2013. WO Patent 2,013,055,707.
24. D. Das, M. O. Filipovich, J. J. Corso, and G. D. Hager. Systems and methods for motion and distance measurement in gastrointestinal endoscopy, Jan. 3 2013. US Patent 20,130,002,842.
25. G. D. Hager, M. Ishii, E. M. Meisner, D. J. Marota, and H. N. Tokgozogl. Imaging system and method for use of same to determine metric scale of imaged bodily anatomy, May 16 2013. US Patent App. 13/895,813.
26. Balicki, Marcin A., Russell H. Taylor, Gregory D. Hager, Peter L. Gehlbach, James Handa, and Rajesh Kumar. Visual Tracking And Annotation Of Clinically Important Anatomical Landmarks For Surgical Interventions. U.S. Patent 20,120,226,150, issued September 6, 2012.

27. Hager, Gregory D., Balakrishnan Varadarajann, Sanjeev Khudanpur, Rajesh Kumar, Carol E. Reiley, and Henry C. Lin. Method And System For Quantifying Technical Skill. European Patent EP 2409286, issued January 25, 2012.
28. Hager, Gregory, and Nicolas Padoy. Human-Machine Collaborative Robotic Systems. WIPO Patent 2012065175, issued May 19, 2012.
29. Hager, Gregory Donald, and Nicolas Padoy. System And Method For Detecting And Tracking A Curvilinear Object In A Three-Dimensional Space. WIPO Patent 2012116198, issued August 31, 2012.
30. Kumar, Rajesh, Gregory D. Hager, Amod S. JOG, and David D. Yuh. System And Method For The Evaluation Of Or Improvement Of Minimally Invasive Surgery Skills. WIPO Patent 2012060901, issued May 11, 2012.
31. Kumar, Rajesh, Themistocles Dassopoulos, Hani Girgis, and Gregory Hager. System And Method For Automated Disease Assessment In Capsule Endoscopy. U.S. Patent 20,120,316,421, issued December 13, 2012.
32. Kumar, Rajesh, Gregory D. Hager, Amod S. Jog, Yixin Gao, May Liu, Simon Peter DiMaio, Brandon Itkowitz, and Myriam Curet. Method And System For Analyzing A Task Trajectory. WIPO Patent 2012151585, issued November 9, 2012.
33. G. Hager, C. Reiley, B. Varadarajan, S. Khudanpur, H. Lin, R. Kumar, Method and System for Quantifying Technical Skill, US Patent Application 2010/028025.
34. G. Hager and B. Wegbreit. System and method for constructing a 3D scene model from an image. US Patent Application 2010/0085358.
35. E. Boctor, G. Fichtinger, G. Hager, and H. Rivaz. Apparatus and Methods for Computing 3D Ultrasound Elasticity Images. US Patent Application 2008/0306384.
36. E. Boctor, G. Hager, G. Fichtinger, and A. Viswanathan. Ultrasound Calibration and Real-Time Quality Assurance Based on Closed Form Formulation US Patent Application 2008/0269604.
37. G. Hager and E. Wegbreit. System and method for recognition in 2D images using 3D class models US Patent Application 2006/0285755.
38. G. Hager and E. Wegbreit. System and method for computing grasps for a robotic hand with a palm US Patent Application 2006/0012198.
39. G. Hager and E. Wegbreit. System and method for 3D object recognition using range and intensity, 2005. USPTO Publication 2005/0286767 A1, Abandoned.
40. G. Hager and E. Wegbreit. Acquisition of three-dimensional images by an active stereo technique using locally unique pattern, US Patent 7103212, issued September, 2006.
41. A Vision-based Six-degree-of-freedom Computer Input Device (with K. Toyama), U.S. Patent 5889505 issued November, 1998.
42. Method and System for Cooperative Control of Manipulator Systems, (with R. Kumar, R. Taylor, A. Barnes and P. Jensen), preliminary patent filed, 2001, Abandoned.
43. Method for Robot Assisted Puncture of a Blood Vessel, (with R. Kumar, R. Taylor, A. Barnes and P. Jensen and E. deJuan), preliminary patent filed, 2001, Abandoned.

44. Method for Creating High Resolution Composite Images, (with R. Kumar, R. Taylor, A. Barnes and P. Jensen), preliminary patent filed, 2001, Abandoned.
45. Method for Manipulating Cells of a Cell Culture (with R. Kumar and R. Taylor), preliminary patent filed, 2001, Abandoned.

TEACHING and MENTORING:

Postdoctoral Students/Research Faculty:

Matthew Holden, Postdoc, 2018-present
Narges Ahmidi, Assistant Research Scientist, 2017-present
Anand Malpani, Assistant Research Scientist, 2017-present
Austin Reiter, Research Assistant Prof. 2014-2018 (now at Snapchat)
Swaroop Vedula, Assistant Research Professor, 2012-present
Rogerio Richa, 2011-2013 (now at University of Santa Catarina, Brazil)
Nicolas Padoy, 2010-2013 (now at University of Strasbourg)
Eric Meisner, 2009-present (now at Faro Technologies)
Hani Girgis, 2009-2010 (now Research Scientist, NIH)
Erion Plaku, 2008-2010 (now Assistant Professor, Catholic University)
Sandrine Voros, 2007-2009 (now Assistant Professor, University of Grenoble)
Hanzi Wang, 2006-2008 (now Professor, Xaimen University)
Danica Kragic, 2002 (now Professor, KTH Sweden)
Darius Burschka, 1999-2005 (now Associate Professor, TU Munich)
Martin Jägersand, 1998-2000 (now Associate Professor, University of Alberta)
Eric Marchand, 1996-1997 (now Senior Researcher, INRIA Rennes)
Markus Vincze, 1996 (now Professor, TU Vienna)

Thesis Students:

Haomin Chen, Ph.D. expected 2022.
Jin Bai, Ph.D. expected 2022.
Myron Brown, Dr.Eng. expected 2021.
Michael Peven, Ph.D. expected 2021.
Molly O'Brien, Ph.D. expected 2020.
Tao Soo Kim, Ph.D. expected 2020.
Andrew Hundt, Ph.D. expected 2020.
Kapil Katyal, Ph.D. expected 2020.
Robert Dipietro, Ph.D. expected 2019.
Christian Rupprecht (TUM), Ph.D. 2018 (now Postdoc Oxford)
Chi Li, Ph.D. 2018, (now Engineer, Apple)
Ayushi Sinha, Ph.D. 2018, (now Postdoc, JHU)

Xiang Xiang, Ph.D. 2018, (now Staff Scientist, Amazon)
 Purnima Rajan, Ph.D. 2018.
 Christopher Paxton, Ph.D. 2018, (now Postdoc, NVidia)
 Colin Lea, Ph.D. 2017, (now Staff Engineer, Oculus)
 Anand Malpani, Ph.D. 2017, (now Research Scientist, JHU)
 Nishikant Deshmukh, Ph.D. 2016.
 Will Gray, Ph.D. 2016, (now Staff Scientist, JHU Applied Physics Lab)
 Haluk Tokgozoglu, Ph.D. 2016, (now Machine Learning Engineer, Uber)
 Narges Ahmidi, Ph.D. 2015, (now Team Leader, Helmholtz Munich Center)
 Carol Reiley, Ph.D. withdrew.
 Kelleher Guerin, Ph.D. 2015, (now CTO and Co-Founder, Ready Robotics)
 Ioana Fleming, Ph.D., 2014, (now Instructor, CU Boulder)
 Daniel Mirota, Ph.D, 2013, (now Engineer, Intel)
 Pezhman Foroughi, Ph.D, 2013, (now CTO at Clear Guide Medical)
 Danel Abretske, withdrew.
 Raphael Sznitman, Ph.D. 2011, (now faculty, University of Bern).
 Zachary Pezzementi, Ph.D. 2011 (now Research Scientist, CMU).
 Sharmishta Seshamani, Ph.D. 2011 (now postdoc, University of Washington).
 Hassan Rivaz, Ph.D. 2010 (now faculty, Concordia University)
 Henry Lin, Ph.D. 2009 (now Senior Engineer, Intuitive Surgical)
 Tiffany Chen, MSE, 2008 (now researcher, Toyota Research)
 Maneesh Dewan, Ph.D. 2007 (now at Google)
 Le Lu, Ph.D. 2007 (now at NIH)
 Guangqi Yeh, Ph.D. 2005 (now at Google)
 Jason Corso, Ph.D. 2005 (now Associate Prof., University of Michigan)
 Xingtian Dai, Ph.D. 2005 (now at Google)
 Izzet Pembeci, Ph.D. 2003 (unknown)
 Nicholas Ramey, M.S.E 2003 (now in practicing physician)
 Samuel Lange, M.S.E, 2002 (unknown)
 Zachary Dodds, Ph.D. 2000 (now Professor, Harvey Mudd)
 Christopher Rasmussen, Ph.D. 2000 (now Professor, University of Delaware)
 Aage Bendiksen, M.S. degree received 1995 (unknown)
 Jesse Reklaw, M.S. received 1998 (unknown)
 Kentaro Toyama, Ph.D received 1997 (former Vice President, Microsoft Research India; now Associate Prof, University of Michigan)
 Jonathan Wang, M.S. degree received 1996 (unknown)
 Sami Atiya, Ph.D. received 1995 (now high-level Siemens Management)

Listed Courses Taught or Co-Taught:

Machine Learning: Deep Learning, F/S 2018.
 Algorithms for Sensor-based Robotics, 2006, 2009.
 Data Structures, 2005, 2007, 2010, 2011, 2015, 2016.
 Vision-Based Interaction in Man and Machine, 2000
 Computer Vision, 1991 - 2014.
 Artificial Intelligence, 1992-1993, 1996, 1997, 1999, 2000.
 Analytical Introduction to Engineering Issues in Robotics (new course), 1994-1999.
 Autonomous Systems (new course), 1993, 1995, 1997, 1999.
 A Second Course in Programming (new course), 1993, 1994, 1997.
 Programming in Fortran, 1992-1993.

Seminar Courses:

Topics in Intelligent Autonomous Systems, 1992
 Topics in Sensing for Artificial Intelligence and Robotics Applications, 1991

FUNDING

1. Intuitive Surgical: “Autonomous Suturing from Simulation to Benchtop” for \$50,000 from 1/1/2019 to 12/31/2019.
2. DoD: “A Fundamental Theory for Dexterous Surgical Skills Transfer to Medical Robots” for \$215,985 from 10/1/2018-9/30/2020 (Subcontract from Purdue U.).
3. NSF: “RI:Medium: Robots that Learn from Description through Synthesis and Analysis” for \$1,197,452 from 9/1/2018 to 8/31/2021 (PI).
4. IARPA: “Machines with Imagination: Learning from Description through Synthesis and Analysis” for \$1,835,359 from 9/20/2017-3/18/2019 (PI).
5. NSF: “NRI:Collaborative:Experiential learning for robots: from physics to actions to tasks” for \$765,033 from 10/01/2016 to 09/30/2019 (PI).
6. NIH: “Objective assessment of surgical competence in a septoplasty model” for \$3,829,827 from 9/1/2016 to 8/31/2021 (key personnel).
7. NSF: “Building spatial skills in the 21st century” for \$1,340,672 from 7/1/2016 to 6/30/2020 (co-PI).
8. NSF: “NRI-Large: Collaborative Research: Multilateral Manipulation by Human-Robot Collaborative Systems” for \$586,942 from 7/1/12 to 6/30/16 (Co-PI).
9. NIH: “Enhanced Navigation for Endoscopic Sinus Surgery Through Video Analysis” for \$2,822,899 from 07/01/2012 to 06/30/2017.
10. NSF: “International: A US-Germany Research Collaboration on Systems for Computer-Integrated Healthcare” for 147,320 from April 6, 2011-April 5, 2014.
11. NIH SBIR “Precisely Shaped Acoustic Ablation of Tumors under 3D Ultrasound Image Guidance” (Burdette, PI) for 1,022,500 (total) July 1 2008 to June 30, 2013.

12. NIH: Automated Assessment of the Effects of System Limitations Based Upon Data Collected from Multiple Training Centers (Kumar PI), for 439,116 from July 1 2009 to June 30 2011.
13. NSF: "CPS: Medium: Hybrid Systems for Modeling and Teaching the Language of Surgery " for 1,499,828 from July 1, 2009 to June 30, 2012.
14. NSF: "CDI Type-II: Language Models for Human Dexterity" for 1,685,877 July 1, 2009 to June 30, 2013.
15. NIH: "A Microsurgical Assistant System" (R. Taylor PI), for 5,500,000 from July 1, 2008-June 30, 2013.
16. NIH: "Quantitative Endoscopic Measurement of Anatomy Video," (G. Hager, PI with M. Ishii), for 440,512 from July 1, 2008 to June 30, 2010.
17. NIH: "Toward Quantitative Disease Assessment from Capsule Endoscopy Images," (G. Hager, PI with T. Dassopoulos), for 421,909 from July 1, 2007 to June 30, 2009.
18. Army/GDRS: "Recognition of Individual and Group Activities in Video," for 121, 943 from July 24, 2008-Feb. 23, 2009.
19. TATRC: "Context Aware Surgical Assistance for Virtual Mentoring," (G. Hager (PI), R. Taylor) for 155,216 from January 31, 2006 to May 29, 2007.
20. NSF: "Structure Induction for manipulative and Interactive Tasks," (G. Hager, PI and S. Khudanpur), 480,000 from February 01, 2006 to January 31, 2009.
21. WSE/APL; "Vision-Aided Guidance, Navigation and Control of Small Unmanned Aerial Vehicles," for 50,000 from September 01, 2005 - August 31, 2007.
22. NSF: "Manipulating and Perceiving Simultaneously (MAPS)," for 200,000 from Oct, 1. 2007-Sept. 30, 2009.
23. Paul Maritz Fund: "Learning to See: Structures for Data-Driven Computational Vision on a Massive Scale," for 90,000 from February 01, 2006 - January 31, 2008.
24. NIH: "Direct Video-CT Registration for High Precision Endoscopic Interventions," (G. Hager, PI, M. Ishii and R. Taylor), for 440,348 from April 01, 2006 to March 30, 2008.
25. NSF: "A Flexible Human-in-the-Loop Microsystem Assembly Platform, (Phase I SBIR with Invenios, Inc) for 30000 from January, 2004 - July 01, 2004.
26. NIH: "Tracking and Mosaicking in the Endometrium," (Phase I SBIR with Infinite Biomedical Tech. Inc.), for 72,000 from January 26, 2005 - July 26, 2005.
27. NSF: "ITR:Modeling, Synthesis and Analysis of Human-Machine Collaborative Systems," (G. Hager (PI), A. Okamura, R. Taylor and B. Hannaford) for 1,100,000 from 8/1/02-7/31/07.
28. NSF: "ITR/SY:Software Systems for Vision-based Spatial Interaction," for 450,000 from 8/1/01-7/31/04.
29. NSF: "ERC PER: A Quantitive Eye Atlas," (G. Hager (PI), B. Roysam (RPI)) for 150,000 from 8/1/01-7/31/03.
30. NSF: "Scale-Invariant Skill Augmentation for cooperative Human-Machine Micromanipulation Systems," (G. Hager (PI), A. Okamura and R. Taylor) for 380,000 from 8/1/01-7/31/04.

31. DARPA: “Composition and Adaptation of Goal-Oriented Robotic Systems” (G. Hager (PI), P. Hudak and D. McDermott) for \$2,304,083 from 4/1/00-4/1/04.
32. DARPA: “Environment-Independent Perception and Navigation for Tactical Mobile Robots: A Diktiometric Approach” (G. Hager (PI), D. Kriegman and D. McDermott) for \$750,000 from 6/98-6/00.
33. NSF: “A Compositional Approach to Vision-Based Manipulation” (G. Hager (PI) and M. Jägersand) for \$66,000 from 6/98-6/00 (CISE Postdoctoral Research Award)
34. ARO: “Visual Tracking as Stabilization” (G. Hager (PI) and D. Kriegman) for \$270,000 from 3/1/98-3/1/01.
35. ARO: “Next Generation Vision-Based Control Systems” (G. Hager (PI), A.S. Morse and D. Kriegman) for \$129,945 from 3/1/97-3/1/98 (DURIP equipment grant).
36. NSF: “Domain-Independent Vision-Based Navigation” (D. Kriegman (PI) and G. Hager) for \$419,184 from 9/1/97–10/31/00 .
37. NSF: “The Block Island Workshop on Vision and Control” (G. Hager, PI) for \$14,500 from 6/1/97–5/30/98.
38. NSF: “ A Modular Toolkit for Vision and Robotics – An Experiment in Domain-Specific Software Architectures” (G. Hager (PI) and P. Hudak) for \$1,223,090 over 4 years from 6/1/97-6/1/01.
39. DARPA: “Point-Man Robot” (STTR subcontract through Nomadics Inc.) for \$45,000, over 1 year from 6/1/97 - 6/1/98.
40. Siemens Corp: “Light-Weight Vision for Enhanced Mobility” (G. Hager, PI)for \$40,000, over 1 year from 1/1/97 - 9/30/97.
41. NSF: “Calibration Insensitive Hand-Eye Coordination for Robotic Systems Based on Stereo Vision” (G. Hager, PI) for \$240,000 over 3 years from 8/95-8/98.
42. DARPA: “Equipment for Sensor-Based Navigation and Control of Autonomous Agents” (D. McDermott (PI) and G. Hager) for \$75,000 from 1/23/95–1/23/96.
43. DARPA: “Sensor-based and Geometry-based Planning for Autonomous Agents” (with D. McDermott (PI) and G. Hager) for \$971,489 from 10/1/93–5/31/96.
44. NSF: “Resource-Bounded Sensor-Based Decision Making in Unconstrained Environments” (G. Hager, PI) for \$170,245 from 9/1/91–2/28/94
45. NSF: “A Range Finder & Manipulator for Empirical Verification of Sensor-Based Decision Making” (D. Kriegman (PI) and G. Hager) for \$40,000 from 5/1/91–2/28/93 .
46. NATO: “NATO Collaborative Research Grant Between Yale University and the DLR” (G. Hirzinger, PI) for \$5000 from 9/1/92—9/1/94.
47. NATO: “NATO Collaborative Research Grant Between Yale University and the DLR” (G. Hirzinger, PI) for \$5000 from 9/1/91—9/1/92.