Michael J. Black

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Contact

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Research Interests

Computer Vision: Estimating human and animal pose, shape and motion from images and videos.

Computer Graphics: Motion capture, 3D shape capture and modeling, animation, avatars in AR/VR, clothing capture and modeling.

Machine Learning: 3D shape learning, meshes, implicit surfaces, generative models, temporal models and human behavior.

Virtual Humans: Learning human shape, motion, and appearance, emotion, faces and gestures, neural rendering, implict shape models, clothing, action and behavior.

Education

YALE UNIVERSITY   New Haven, CT
Ph.D., Computer Science, 1992.

STANFORD UNIVERSITY   Stanford, CA
M.S., Computer Science, 1989.

THE UNIVERSITY OF BRITISH COLUMBIA   Vancouver, BC
B.Sc., First Class, Honours Computer Science, 1985.

Positions Held

MAX PLANCK SOCIETY   Tübingen, Germany
Director, Max Planck Institute for Intelligent Systems, 1/11 – present,
Managing Director (MD), 2/13 – 6/15, 3/18 – 11/18, 7/23 – present.
Deputy MD and Local MD in Tübingen, 1/22 – 6/23.

I am a founding director at Max Planck Institute for Intelligent Systems where I lead the Perceiving Systems Department.

EBERHARD KARLS UNIVERSITÄT TÜBINGEN   Tübingen, Germany
Honorarprofessor, Dept. of Computer Science, 5/12 – present.

AMAZON   Tübingen, Germany
Distinguished Amazon Scholar,
VP Technology – Software Dev, Sept. 2017 – Mar. 2020,
Amazon Scholar, Mar 2020-Dec. 2021.

ETH ZÜRICH   Zürich, Switzerland
Visiting Professor, Electrical Engineering, 4/14 – 4/16.

STANFORD UNIVERSITY   Stanford, CA
Visiting Professor, Electrical Engineering, 5/11–4/12, 7/12–6/13.

I collaborated with Prof. Krishna Shenoy's group to analyze the neural control of natural movement using wireless neural recording and markerless motion capture.

BROWN UNIVERSITY   Providence, RI
Adjunct Professor (Research), Department of Computer Science, 1/11 – 12/20,
Professor, Department of Computer Science, 7/04 – 12/10,
Associate Professor, Department of Computer Science, 7/00 – 6/04.

My vision research addressed problems of probabilistic inference using machine learning and statistical estimation techniques. My work in early vision included learning Markov random fields, modeling image statistics, and estimating optical flow. A particular focus was human motion detection, estimation, tracking and analysis.

My work on brain-machine interfaces focused on probabilistic models of neural coding in motor cortex and the decoding of this activity using Bayesian inference. This work was part of an interdisciplinary effort to develop prosthetic devices for the severely disabled.

XEROX PALO ALTO RESEARCH CENTER   Palo Alto, CA
Area Manager, Digital Video Analysis, 8/98–7/00,
Area Manager, Image Understanding Area, 1/96–1/99,
Member of Research Staff, II, 9/93–12/95.

Research on motion estimation with an emphasis on human motion. Learning linear models of motion, generalizing motion estimation to other forms of appearance change, recovering motion discontinuities, probabilistic methods for motion estimation, recognition of facial expressions and gestures.

Management responsibilities included: performance evaluation, budgeting, internal grant writing, hiring, coordinating with senior management, contracting with Xerox business groups, presentations to Xerox and the external world, and career development.

ROYAL INSTITUTE OF TECHNOLOGY (KTH)   Stockholm, Sweden
Visiting Scientist, Computational Vision and Active Perception group, 9/98–1/99.

Pursued research on learning parameterized spatio-temporal models of motion events and computational techniques based on stochastic search for exploiting these models for motion-based recognition.

UNIVERSITY OF TORONTO   Toronto, Ontario
Adjunct Professor, Department of Computer Science, 1995–1996,
Assistant Professor, (not tenure-track), Department of Computer Science, 8/92–9/93.

Research included the introduction of mixture models for optical flow estimation, detection and tracking of surface discontinuities using motion information, and robust surface recovery in dynamic environments.

YALE UNIVERSITY,   New Haven, CT
Research Assistant, Department of Computer Science, 9/89–8/92.

Introduced robust statistical approaches for estimating optical flow. Also pursued research on incremental estimation, temporal continuity, and the early detection of motion discontinuities.

NASA AMES RESEARCH CENTER   Moffett Field, CA
Visiting Researcher, Aerospace Human Factors Research Division, 6/90–8/92.

Developed motion estimation algorithms in the context of an autonomous Mars landing and nap-of-the-earth helicopter flight and studied the psychophysical implications of a temporal continuity assumption.

ADVANCED DECISION SYSTEMS   Mountain View, CA
Computer Scientist, Image Understanding Group, 12/86–6/89.

Research on spatial reasoning for robotic vehicle route planning and terrain analysis. Vision research including perceptual grouping, object-based translational motion processing, the integration of vision and control for an autonomous vehicle, object modeling using generalized cylinders, and the development of an object-oriented vision environment.

GTE GOVERNMENT SYSTEMS   Mountain View, CA
Engineer, Artificial Intelligence Group, 6/85–12/86.

Developed expert systems for multi-source data fusion and fault location.

Teaching Experience

BROWN UNIVERSITY, Spring 2004, 2006, 2008, 2009, 2010, Fall 2010

Providence, RI

Topics in Computer Vision.

BROWN UNIVERSITY, Fall 2003, 2004, 2005, 2007, 2008, 2009   Providence, RI
Introduction to Computer Vision.

BROWN UNIVERSITY, Fall 2001, 2002; Spring 2005   Providence, RI
Topics in Brain-Computer Interfaces.

BROWN UNIVERSITY, Spring 2001, 2002, 2003   Providence, RI
Introduction to Software Engineering.

BROWN UNIVERSITY, Fall 2000   Providence, RI
Topics in Machine Vision and Learning. Co-taught with Thomas Hofmann.

UNIVERSITY OF TORONTO, Spring 1993   Toronto, Ontario
Applications of Artificial Intelligence.

YALE UNIVERSITY   New Haven, CT
1/91–12/91, Supervision of three undergraduate senior projects.
9/89–12/89, *Teaching Assistant,* Department of Computer Science.

UNIVERSITY OF BRITISH COLUMBIA, 9/84–5/85   Vancouver, BC
Teaching Assistant, Department of Computer Science.

Consulting and Start-up Activity

Meshcapade GmbH, Co-founder (2018) and Chief Scientist (since Oct. 2022).

Body Labs Inc., Co-founder, Member of the Board, Science Advisor, Mar. 2013 – Sept. 2017. Acquired by Amazon.com, Sept. 2017.

Willow Garage, Advisory Board, Dec 2008 – 2013.

Videosurf Inc., San Mateo, CA., Scientific Advisory Board, Oct. 2006 – Nov. 2011. Acquired by Microsoft.

Intel Research, Computational Nano-Vision Group, Consultant, Nov. 2001 – Dec. 2007.

Cyberkinetics Inc., Foxboro MA, Consultant, July 2004 – Dec. 2004.

Xerox Palo Alto Research Center, Consultant, July 2000 – Dec. 2001.

Walt Disney, Feature Animation, Consultant, August 2000 – Dec. 2000.

Grants and Gifts

Meta Reality Labs, gift, 50,000 EUR, Dec. 2021.

Creating Lively Interactive Populated Environments, Horizon 2020, 505,577 EUR.

Maschinelles Lernen: Neue Perspektiven fr die Wissenschaft, DFG Excellence Cluster, Sept. 2017; Researcher.

Amazon Research Award (ARA), $250,00, May 2018.

Intel, University Industry Research Corporation, Network on Intelligent Systems, $20,000, Aug. 2017, July, 2018, Oct. 2019.

Intel, $15,000, Feb. 2017.

Collaborative Research Center (SFB 1233) "Robust Vision Inference Principles and Neural Mechanisms", Vice Speaker. Nov. 2016 – present.

Facebook/Oculus, $50,000, Dec. 2015.

Werner Reichardt Center for Integrative Neuroscience, "Investigating Body Representation Distortions in Patient Populations using Biometric Self-Avatars in Virtual Reality," Pool Projekt 2014-13, B. Mohler (PI), S. Zipfel, H.-O. Karnath, H. Y. Wong, and M. J. Black, 60,040 EUR (0 for Black), July 2014–July 2016.

Adobe gift, $8,000, June 2014; $9,000, Oct. 2014; $20,000, May 2022.

Office of Naval Research, Contract W911QY-10-C-0172, "Bodies from scans: Analysis of rigid and non-rigid motion," Co-PI with Erik Sudderth. $1,017,999.99. Oct. 1, 2010-Sept. 31, 2013.

NSF CRCNS program, IIS–0904875, "Collaborative Research: Neural and computational models of spatio-temporally varying natural scenes", Co-PI with Garret Stanley and Jose-Manuel Alonso. $452,681 ($173,412 to Brown), Oct. 1, 2009 – 2011.

Office of Naval Research award N0014-06-0185. "Neural Interfaces to Understand Human Motor Performance," 10/25/2005–10/26/2006, $963,000. With J. Donoghue and A. Nurmikko.

Office of Naval Research award N0014-04-1-082, "Neural Interfaces to Enhance Human Motor Performance," 10/4/2004–12/30/2005, $960,000. With J. Donoghue and A. Nurmikko.

European Commission, Beyond Robotics Program, "NEUROBOTICS – The Fusion of Neuroscience and Robotics," 1/1/2004–1/1/2008, International partner in large European consortium, total grant of 5,640,048 Euro for 60 months (100,000 Euro for the Brown partnership).

Siemens Corporate Research, $25,000, Jan. 2003; $25,000, Apr. 2004.

NIH–NINDS Contract N01-NS-2-2345, "Cortical Control of Neural Prostheses," $1,900,000, Sept. 2002 – Sept. 2005. Co-investigator (with J. Donoghue (PI) and E. Bienenstock).

NIH–NINDS, grant NS25074, "Static and Dynamic Organization of Primate Cortex", $1,470,456, May 2002 – Mar. 2007. Co-investigator (with J. Donoghue (PI) and E. Bienenstock).

NSF, ITR, "The Computer Science of Biologically Embedded Systems," $446,969, Sept. 2001 through Aug. 2005. Principal Investigator (with E. Bienenstock and J. Donoghue).

ONR contract N000140110886, "Motion Capture for Statistical Learning of Human Appearance and Motion," $339,340, May 1, 2001 through May 1, 2004, (DARPA Human-ID project). Principal Investigator.

Xerox Foundation, University Affairs Committee Grant, $15,000, Nov. 2001.

Xerox Foundation, University Affairs Committee Grant, $15,000, May 2000.

Natural Sciences and Engineering Research Council of Canada, Individual Research Grant, April 1993, $20,000/year for three years.

Connaught Fund, Operating Grant, University of Toronto, April 1993, $3,000.

NASA Graduate Student Researchers Program, Training Grant, NGT–50749, 8/91–8/92, $22,000.

"Test of Time" Awards

2024 *ACM SIGGRAPH Asia Test-of-Time Award* for the 2014 paper "MoSh: Motion and Shape Capture from Sparse Markers," by Matthew M. Loper and Naureen Mahmood and Michael J. Black.

2022 *Koenderink Prize* for Fundamental Contributions in Computer Vision, for the 2012 ECCV paper: "A naturalistic open source movie for optical flow evaluation," by Butler, D. J., Wulff, J., Stanley, G. B., Black, M. J.

2020 *Longuet-Higgins Prize* for work that has withstood the test of time; for the paper Sun, D., Roth, S., Black, M. J., "Secrets of optical flow estimation and their principles,"

In IEEE Conf. on Computer Vision and Pattern Recognition (CVPR), pages: 2432-2439, IEEE, June 2010

2013 *Helmholtz Prize* for work that has stood the test of time; for the paper: Black, M. J., and Anandan, P., "A framework for the robust estimation of optical flow," IEEE International Conference on Computer Vision, ICCV, pages 231-236, Berlin, Germany. May 1993.

2010 *Koenderink Prize* for Fundamental Contributions in Computer Vision, for the paper: Sidenbladh, H., Black, M. J., and Fleet, D. J., "Stochastic tracking of 3D human figures using 2D image motion," *European Conference on Computer Vision*, 2000.

Paper/Data Awards

Best Faculty Paper Award (2023), University of Stuttgart, for the paper "Viewpoint-driven Formation Control of Airships for Cooperative Target Tracking," by Eric Price, Michael Black, Aamir Ahmad, *IEEE Robotics and Automation Letters*, 8(6):3653-3660, 2023.

Honorable Mention for Best Paper at SIGGRAPH Asia 2023 for the paper "From Skin to Skeleton: Towards Biomechanically Accurate 3D Digital Humans," by Marilyn Keller, Keenon Werling, Soyong Shin, Scott Delp, Sergi Pujades, C. Karen Liu, Michael J. Black.

"SMPL: A Skinned Multi-Person Linear Model," selected as a "Seminal Paper" by ACM and included in *Seminal Graphics Papers: Pushing the Boundaries, Volume 2*, Association for Computing Machinery, August 2023.

Best in Physics (Multi-Disciplinary) for the abstract: Atharva Peshkar, Danna Gurari, Sergi Pujades, Michael Black, David Thomas, "Computer vision assisted alignment for stereotactic body radiation therapy (SBRT)." *65th Annual Meeting & Exhibition of the American Association of Physicists in Medicine (AAPM)*, Houston, TX, July 23 - 27, 2023.

ICLR 2023 notable top 25%. "MeshDiffusion: Score-based Generative 3D Mesh Modeling," Zhen Liu, Yao Feng, Michael J. Black, Derek Nowrouzezahrai, Liam Paull, Weiyang Liu.

Best Paper, German Conference on Pattern Recognition, GCPR, 2022. "InvGAN: Invertible GANs," Ghosh, P., Zietlow, D., Black, M.J., Davis, L., Hu, X.

Honorable mention for Best Paper, German Conference on Pattern Recognition, GCPR, 2022. "InterCap: Joint Markerless 3D Tracking of Humans and Objects in Interaction," Huang, Y., Taheri, O., Black, M.J., Tzionas, D.

Best paper award nomination, CVPR 2022. "Accurate 3D Body Shape Regression using Metric and Semantic Attributes," Choutas, V., Mller, L., Huang, C. P., Tang, S., Tzionas, D., Black, M. J. In Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), pages: 2718-2728, June 2022.

PLoS ONE top 10% most cited, July 2021, for papers published in 2018. For the paper "Body size estimation of self and others in females varying in BMI".

Best paper candidate, CVPR 2021, "SCANimate: Weakly Supervised Learning of Skinned Clothed Avatar Networks," by S. Saito, J. Yang, Q. Ma, and M. Black.

Best paper candidate, CVPR 2021, "On Self-Contact and Human Pose," by L. Müller, A. Osman, S. Tang, C.-H. Huang, M. Black.

Best Paper Award, International Conference on 3D Vision (3DV), 2020, for the paper "Grasping Field: Learning Implicit Representations for Human Grasps," by Karunratanakul, K., Yang, J., Zhang, Y., Black, M., Muandet, K., Tang, S.

Best Poster Award, Deutsche Gesellschaft für Essstörungen (DGESS), 2018, "Körper Sprache: Sprachliche Repräsentation von Körpern bei Patientinnen und Patienten mit Essstörungen," by Walder L., Quiros-Ramirez M.A., Mohler B., Black M.J., Keizer A., Zipfel S., Giel K., Mölbert S.

Best Paper Award, Eurographics 2017, for the paper "Sparse Inertial Poser: Automatic 3D Human Pose Estimation from Sparse IMUs," by von Marcard, T., Rosenhahn, B., Black, M. J., Pons-Moll, G.

Dataset Award, 2016 Eurographics Symposium on Geometry Processing (SGP), for the "FAUST Dataset," with F. Bogo, J. Romero, and M. Loper.

Best Paper Award, International Conference on 3D Vision (3DV), 2015, with A. O. Ulusoy and A. Geiger for the paper "Towards Probabilistic Volumetric Reconstruction using Ray Potentials."

Journal of Neural Engineering Highlights of 2011 Collection: "Neural control of cursor trajectory and click by a human with tetraplegia 1000 days after implant of an intracortical microelectrode array," J D Simeral, S-P Kim, M J Black, J P Donoghue and L R Hochberg 2011 J. Neural Eng. 8 025027.

Journal of Neural Engineering Highlights of 2008 Collection: "Neural control of computer cursor velocity by decoding motor cortical spiking activity in humans with tetraplegia," S.-P. Kim, J. D. Simeral, L. R. Hochberg, J. P. Donoghue and M. J. Black, *J. Neural Eng.* 5(4):455-476, Dec. 2008.

Best Paper Award, INI-Graphics Net, 2008, First Prize Winner of Category Research, with S. Roth for the paper "Steerable random fields."

Best Paper Award, Fourth International Conference on Articulated Motion and Deformable Objects (AMDO-e 2006), with L. Sigal for the paper "Predicting 3D people from 2D pictures."

Marr Prize, Honorable Mention, Int. Conf. on Computer Vision, ICCV-2005, Beijing, China, Oct. 2005 with S. Roth for the paper "On the spatial statistics of optical flow."

Marr Prize, Honorable Mention, Int. Conf. on Computer Vision, ICCV-99, Corfu, Greece, Sept. 1999 with D. J. Fleet for the paper "Probabilistic detection and tracking of motion discontinuities."

IEEE Computer Society, Outstanding Paper Award, Conference on Computer Vision and Pattern Recognition, Maui, Hawaii, June 1991 with P. Anandan for the paper "Robust dynamic motion estimation over time."

Other Awards & Honors

PAMI Distinguished Researcher Award, 2023.

Outstanding Reviewer Award, CVPR 2021, CVPR 2023.

Max-Planck-Grndungspreis des Stifterverbandes, Science Prize 2022 in the Entrepreneurship category, to Naureen Mahmood, Talha Zaman, and Michael J. Black for the Meshcapade GmbH team, in recognition of this successful spin-off and the particularly high impact on society. Berlin, June 21, 2022.

German National Academy of Sciences, Leopoldina, member, March 2021 – present.

NeurIPS 2020, Top 10% Reviewer.

AI 2000 Computer Vision Most Influential Scholars, Honorable Mention, 2020.

Alumni Research Award, Univ. of British Columbia, May 2018.

Royal Swedish Academy of Sciences, Foreign Member, Class for Engineering Sciences, June 2015 – present.

Honorarprofessor, May, 2012 – present. Eberhard Karls Universität Tübingen, Germany.

Scientific Member, Max Planck Society, Jan. 2011.

Commendation and Chief's Award, Henrico County Division of Police, County of Henrico, Virginia, April 19, 2007.

University of Maryland, *Invention of the Year*, 1995, "Tracking and Recognizing Facial Expressions," with Y. Yacoob.

University of Toronto, Computer Science Students' Union *Teaching Award* for 1992–1993.

Nomination: ACM Doctoral Dissertation Award, 1993.

National Research Council, Research Associateship Award, 1992 (declined).

Yale University Fellowship, 89–90 academic year.

University of British Columbia, Dean's Honour List, 1985.

National Science Foundation, Graduate Fellowship, Honorable Mention, 1985.

Natural Sciences and Engineering Research Council, Summer Research Scholarship, 1984.

Professional Service

Spokesperson and member of the Executive Board, Cyber Valley, Feb. 2017 – Nov. 2017, Mar. 2018 – present.

Member of the Executive Board, Cyber Valley, Mar. 2018 – present.

Academic Advisory Boards

External Advisory Committee (EAC) for Stanford Universitys Mobilize Center, a Biomedical Technology Resource Center funded by the National Institutes of Health, March 2020 – present.

Chair, Scientific Advisory Board, Computer Science Department, *École Normale Supérieure*, Paris, 2016.

Expert Consultation on the Artificial Intelligence Strategy in Germany, Federal Chancellor's office, 29 May 2018.

Award Committees

Thomas S. Huang Memorial Award Committee, CVPR 2021, 2022, 2024
Paper Awards Committee, *Int. Conf. on Computer Vision*, ICCV 2019,
PAMI Young Investigator Award Committee, 2016.
Paper Awards Committee, *IEEE Conf. Comp. Vis. Pattern Recog.*, CVPR 2009.

Editorial

Editorial Board, *International Journal of Computer Vision*. Jan. 2004 – Oct. 2008.
Guest Editor (with Leonid Sigal), *International Journal of Computer Vision*, Special Issue on Evaluation of Articulated Human Motion and Pose Estimation, Vol. 87, No. 1–2, 2010.
Guest Editor (with Ben Kimia), *International Journal of Computer Vision*, Special Issue on Vision at Brown, 2003.
Associate Editor, *IEEE Transactions on Pattern Analysis and Machine Intelligence,* March 1998 – Dec. 2000.

Program Chair or Co-organizer

Co-organizer, Scenes from Video (SfV) Workshop, VI, Barossa Valley, Australia, Dec. 2024.
Co-organizer, Foundation Models for 3D Humans, ECCV 2024 Workshop, October. Milan, Italty.
Co-organizer, Scenes from Video (SfV) Workshop, V, Champagne, France, Oct. 2023.
Diversity, Equity and Inclusion Co-Chair, ICCV 2023.
Advisory board, Human-centric Trustworthy Computer Vision: From Research to Applications, at ICCV 2021.
Co-organizer, SMPL made Simple, Tutorial at CVPR 2021.
Co-organizer, CV4Animals: Computer Vision for Animal Behavior Tracking and Modeling, CVPR2021 workshop, June, 2021.
Co-organizer, 3D Poses In the Wild Challenge, ECCV 2020 workshop, Glasgow, Aug. 2020.
Co-organizer, Scenes from Video (SfV) Workshop, IV, Ribera del Duero, Spain, Sept. 2019.
Co-organizer, Scenes from Video (SfV) Workshop, III, Lago di Garda, Italy, Oct. 2017.
SIGGRAPH Course, Co-organizer, "Learning human body shapes in motion,"

Anaheim, CA, 2016.

Co-organizer, Scenes from Video (SfV) Workshop, II, Santa Cruz, Chile, Dec. 2015.

Tutorial co-organizer, "How to build a digital human body," at ICCV, Santiago, Chile, Dec. 2015.

Co-organizer, Computational Vision Summer School, Freudenstadt-Lauterbad (Black Forest), July-Aug 2015.

Computer Vision Workshop, ETH-MPI Network on Learning Systems, Tübingen, Nov. 2014.

Co-organizer, Scenes from Video (SfV) Workshop, Barossa Valley, Australia, Dec. 2013.

Co-organizer, Computational Vision Summer School 2012, Freudenstadt-Lauterbad (Black Forest), June-July 2012.

Co-organizer, EHuM-2: Evaluation of Articulated Human Motion and Pose Estimation, Workshop at CVPR 2007.

Co-organizer, EHuM: Evaluation of Articulated Human Motion and Pose Estimation, Workshop at NIPS 2006.

General Co-Chair, International Symposium on Vision by Brains and Machines, November 13–17, 2006, Montevideo, Uruguay.

Co-organizer, NSF Planning Meeting on Data Sharing in Computational Neuroscience, Arlington, VA June 2006.

Program Co-Chair, Fourth International Conference on Automatic Face and Gesture Recognition, Grenoble, France, March 2000.

Area Chair (or equivalent)

IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2016, 2009, 2008, 2007, 2006, 2004, 2001, 2000, 1998.

European Conference on Computer Vision (ECCV), 2012, 2010, 2008, 2006, 2002.

International Conference on Computer Vision (ICCV), 2001, 1999.

Neural Information Processing Systems (NIPS), 2007.

Theme chair, 1st IEEE/EMBS Int. Conf. on Neural Engineering, 2003.

Papers Committee member, SIGGRAPH 2002.

Program Committee Member, Conferences

Bernstein Conference, Tübingen, Germany, Sept. 24–27, 2013.

International Conference on Computer Vision (ICCV), 2005, 2003, 1995.

IEEE Conference on Computer Vision and Pattern Recognition (CVPR) 2005, 2003, 1999.

European Conference on Computer Vision (ECCV), 2004, 2000.

16th International Conference on Pattern Recognition (ICPR), 2002.

International Conference on Automatic Face and Gesture Recognition, 2002, 2000, 1998, 1996.

Program Committee Member, Workshops

CVPR 2013 Workshop on Ground Truth - What is a good dataset?, at CVPR 2013.

First Workshop on Unsolved Problems in Optical Flow and Stereo Estimation,

at ECCV 2012.

2nd Workshop on Human Motion Understanding, Modeling, Capture and Animation, 2007.

IEEE Computer Society Workshop on Motion and Video Computing, 2005.

Workshop on Analysis and Modeling of Faces and Gestures, at ICCV 2003.

3rd Int. Workshop on Statistical and Computational Theories of Vision, 2003, 1999.

Computer Vision for the Nano-Scale, workshop at CVPR, 2003.

ECCV Workshop on Vision and Modelling of Dynamic Scenes, 2002.

IEEE Int. Workshop on Cues in Communication, 2001.

IEEE Workshop on Human Motion, 2000.

IEEE Human Modeling, Analysis and Synthesis Workshop 2000.

VISALGS – Vision Algorithms: Theory and Practice, 1999.

Workshop on Non-Rigid and Articulate Motion, 1997.

Other

3DGV virtual seminar series on Geometry Processing and 3D Computer Vision, 2020, Senior Supervisor

Doctoral Consortium, Committee Member, (CVPR 2012, CVPR 2014, ICCV 2015, CVPR 2016, ICCV 2017, CVPR 2019, ICCV 2019)

Organizer, 2nd San Francisco Bay Area Vision Meeting. *Motion: The next 10 years.* Xerox Palo Alto Research Center, Dec. 1997.

Planning meeting member for the Capitol Hill Congressional Conference on "New Frontiers in Breast Cancer Imaging and Early Detection," Washington D.C., July 1994.

Chair of the 1993 IJCAI panel on Action, representation, and purpose: Re-evaluating the foundations of computational vision.

Reviewing   Reviewed journal papers for:

IEEE Transactions on Biomedical Engineering,

IEEE Transactions on Neural Systems and Rehabilitation Engineering,

International Journal of Computer Vision,

IEEE Transactions on Pattern Analysis and Machine Intelligence,

Computer Vision and Image Understanding,

Machine Vision and Applications,

International Journal of Robotics Research,

IEEE Transactions on Circuits and Systems for Video Technology,

Computer Vision Graphics and Image Processing: Image Understanding,

IEEE Transactions on Image Processing,

Journal of Visual Communication and Image Representation.

Reviewer (conferences and workshops):

SIGGRAPH (1998, 2003, 2015, 2020),

SIGGRAPH Asia (2014, 2015, 2016)

Int. Workshop on Vision, Modeling and Visualization (2014),

International Conference on Computer Vision (1993, 1995, 1999, 2021, 2023),

Computer Vision and Pattern Recognition (1991, 1997, 1998, 1999, 2010,

2021, 2022, 2023),
European Conference on Computer Vision (2000, 2004),
Int. Conf. on Automatic Face and Gesture Recognition (1996, 1998),
Neural Information Processing Systems (NIPS/NeurIPS) (2003, 2006, 2020),
Graphics Interface, 2000,
Interactive 3D Symposium, I3D, 2000,
IEEE Human Modeling, Analysis and Synthesis Workshop 2000,
VISALGS Workshop – Vision Algorithms: Theory and Practice 1999,
IEEE Workshop on Non-rigid and Articulate Motion 1997,
International Joint Conference on Artificial Intelligence 1993,
IEEE Workshop on Visual Motion 1991.

Reviewed grant applications for:

National Science Foundation (2000, 2006 (CRCNS)),
NSERC Canada (2000, 2001, 2002, 2004, 2005),
National Institutes of Health (2000),
University of California at Berkeley MICRO (Microelectronics Innovation and
Computer Research Opportunities) Program (1996).

Reviewed books for Morgan Kaufmann Publishers, Inc.

Reviewed book chapters for: "Motion-Based Recognition," M. Shah and R. Jain (eds.),
Kluwer Academic Pub.

Internal Service

Executive board, International Max Planck Research School (IMPRS) on Intelligent Systems, Feb. 2017 – July 2022.

Max Planck-Humboldt Research Award, Selection Committee, 2021.

Managing Director, Max Planck Institute for Intelligent Systems, Feb. 2013 – June 2015,
Mar. 2018 – Nov. 2018, July 2023 – present.

Overall Deputy Managing Director and Tübingen Managing Director, Max Planck Institute for Intelligent Systems, Jan. 2022 – June 2023.

Acting Director (kommissarischer Leiter), Autonomous Motion Department, MPI for Intelligent Systems, May 2018 – April 2019.

Co-director, MPI-ETH Center for Learning Systems, Apr. 2015 – Sept. 2015.

Member, The President's Science Council at Brown University (March 2009 – Dec. 2010).

Public Relations Committee, Member, Dept. of Computer Science (Sept. 2010 – Dec. 2010).

Lecture Series Committee, Chair, Dept. of Computer Science (Sept. 2010 – Dec. 2010).

Member, Ethical and Responsible Conduct of Research, Curriculum Development Committee (Oct. 2009 – Dec. 2009).

Director of Graduate Studies, Dept. of Computer Science (Jan. 2008 – Dec. 2009, co-Director Jan. 2010 – June 2010).

Tenure and Promotion Committee, Dept. of Computer Science (May. 2009 – Dec. 2010).

Executive committee member, Brown Institute for Brain Science (formerly Brain Science Program). (May 2002 – Dec. 2010).

Member, Strategic Opportunities Committee, Dept. of Computer Science (Sept. 2008 – May 2009).

Co-Director of Graduate Studies, Dept. of Computer Science (Sept. 2007 – Dec. 2007).

Director, Industrial Partners Program, Dept. of Computer Science. (Jan. 2002 – Sept. 2003); Co-Director (Sept. 2003 – July 2006).

Standing Appeals Committee for the Brown University Patent and Invention Policy, Feb. 2006 – June 2006.

Chair, Computer Science faculty search committee (Machine Learning), 2005–2006.

Member, Faculty search committee (Neuro-technology), Brain Science Program, 2005–2006.

Chair, Computational science concentration committee, Computer Science (July 2005 – July 2007).

Faculty search committee, Affirmative action representative, Dept. of Computer Science. (Sept. 2001 – 2005, 2007 – 2008).

Facilities committee, Dept. of Computer Science (June 2002 – Aug. 2004).

Patent and Invention Advisory Committee, Brown University (Feb 2004 – July 2004).

Digital Initiatives Committee, Brown University (April 2003 – Feb. 2004).

Theoretical Neuroscience recruiting committee, Brain Sciences Program, Brown University (2002–2003).

Recruiting committee, NSF Integrative Graduate Education and Research Training Program, "Learning and Action in the Face of Uncertainty: Cognitive Computational and Statistical Approaches." Brown University (Sept. 2000 – Dec. 2002).

Industrial Partners Program, Dept. of Computer Science, Brown University (Oct. 2000 – Dec. 2001).

Organizer, Industrial Partners Program Symposium on *Vision-based Interfaces*, Dept. of Computer Science (May 2001).

Undergraduate Advising

Teodor Mihai Moldovan, Summer 2006 – Spring 2009.

Benjamin Aisen, Fall 2004.

Ben Sigelman, Summer 2002, Fall 2002, Spring 2003. Honors Thesis: "Video-Based Tracking of 3D Human Motion Using Multiple Cameras."

Tiferet Levine, Fall 2002.

Matthew Ivester, Summer 2002.

Timothy Bentley, Summer 2002.

Richard Peter Weistroffer and Dmitri Lemmerman, "Independent Study in the Use of EMG Signals as a Control Device," Spring 2002.

Robert Altshuler, "Tracking Walking People using a Probabilistic Model of Optical Flow," Brown University, Dept. of Computer Science, Spring 2001.

Curren Nachbar, "Hit or Miss: Perspectives on Time-to-Contact Estimation," Brown University, Dept. of Computer Science, Fall 2000.

Master's Advising

Siron Vittayakorn, "2D virtual try-on using 3D bodies," Brown University, Dept. of Computer Science, Spring 2009 – Dec. 2010.

Laura Sevilla, "3D bone tracking in bi-plane X-ray sequences," Brown University, Dept. of Computer Science, Fall 2008 – Aug. 2009.

Payman Yadollahpour, Brown University, Dept. of Computer Science, Fall 2005 – Aug. 2006; jointly with Gregory Shakhnarovich.

Sidharth Bhatia, "3D human limb detection using space carving and multi-view eigen models," Brown University, Dept. of Computer Science, Spring 2004.

Robert Altshuler, "Decomposing Image Sequences into Layers According to Motion with the use of an Appearance Model," Brown University, Dept. of Computer Science, Fall 2001 – Spring 2003.

Wei Wu, "Neural Decoding of Motor Cortex using a Kalman Filter," Brown University, Dept. of Computer Science, Spring 2003.

Yun Gao, "Nonparametric Representation of Neural Activity in Motor Cortex," Brown University, Dept. of Computer Science, Spring 2002.

Philip F. Chen, "Statistical Method for Motion Estimation from Omnidirectional Image Sequences," Brown University, Dept. of Computer Science, Spring 2001.

Xuan Ju, "Estimating time-to-contact by detecting and tracking motion boundaries," Sept. 1992 – Jan. 1994, University of Toronto.

Ph.D. Advising

Shrisha Bharadwaj, Sept. 2024 – present, Max Planck Institute for Intelligent Systems, co-supervised with Victoria Fernandez Abrevaya.

Vanessa Sklyarova, June 2023 – present, MPI-ETH Center for Learning Systems, co-supervised with Otmar Hilliges and Justus Thies.

Peter Kulits, Sept. 2022 – present, MPI for Intelligent Systems, co-supervised with Silvia Zuffi

Artur Grigorev, Sept. 2022 – present, MPI-ETH Center for Learning Systems, co-supervised with Otmar Hilliges

Markos Diomataris, Sept. 2022 – present, MPI-ETH Center for Learning Systems, co-supervised with Otmar Hilliges

Mert Albaba, July. 2022 – present, MPI-ETH Center for Learning Systems, co-supervised with Otmar Hilliges

Haiwen Feng, June 2021 – present, Max Planck Institute for Intelligent Systems.

Sai Dwivedi, Oct. 2021 – present, Max Planck Institute for Intelligent Systems, co-supervised with Dimitris Tzionas

Yufeng Zheng, Feb. 2021 – present, MPI-ETH Center for Learning Systems, co-supervised with Otmar Hilliges

Yuliang Xiu, Dec. 2020 – present, Max Planck Institute for Intelligent Systems, co-supervised with Dimitris Tzionas

Radek Daněček, Nov. 2020 – present, Max Planck Institute for Intelligent Systems, co-supervised with Timo Bolkart

Zicong Alex Fan, 2020 – present, MPI-ETH Center for Learning Systems, co-supervised with Otmar Hilliges

Shashank Tripathi, Sept. 2020 – present, Max Planck Graduate Center for Computer and Information Science

Hongwei Yi, Sept. 2020 – present, MPI-ETH Center for Learning Systems, co-supervised with Siyu Tang

Maria Paola Forte, Nov. 2019 – present, MPI for Intelligent Systems, co-supervised with Katherine Kuchenbecker

Nikos Athanasiou, Aug. 2019 – present, Max Planck Graduate Center for Computer and Information Science, co-supervised with Gül Varol

Muhammad Kocabas, June 2019 – present, MPG-ETH Center for Learning Systems, co-supervised with O. Hilliges.

Eric Price, August 2016 – present, MPI for Intelligent Systems, co-supervised with A. Ahmad.

Marilyn Keller, Sept. 2019 – Nov. 2024, MPI for Intelligent Systems, Co-supervised with Sergi Pujades. Ph. D. Thesis: "Beyond the Surface: Statistical Approaches to Internal Anatomy Prediction."

Nitin Saini, April 2018 – Nov. 2024, MPI for Intelligent Systems, co-supervised by Aamir Ahmad, Uni Stuttgart. Ph.D. Thesis: "Aerial Markerless Motion Capture."

Yao Feng, Sept. 2019 – Oct. 2024, MPI-ETH Center for Learning Systems. Co-supervised with Marc Pollefeys and Timo Bolkart. Ph.D. Thesis: "Learning Digital Humans from Vision and Language."

Soubhik Sanyal, Oct. 2017 – Sept. 2024 International Max Planck Research School, MPI for Intelligent Systems. Ph.D. Thesis: "Leveraging Unpaired Data for the Creation of Controllable Digital Humans."

Ahmed Osman, June 2018 – Sept. 2024, International Max Planck Research School, MPI for Intelligent Systems. Ph.D. Thesis: "Realistic Digital Human Characters: Challenges, Models and Training Algorithms."

Omid Taheri, July 2018 – July 2024, MPI for Intelligent Systems, Co-supervised with Dimitris Tzionis. Ph.D. Thesis: "Modeling Dynamic 3D Human-Object Interactions: From Capture to Synthesis."

Mathis Petrovich, June 2020 – April 2024, cole des Ponts ParisTech (ENPC), Co-supervised with Gül Varol, Ph.D. Thesis: "Natural Language Control for 3D Human Motion Synthesis."

Lea Müller, Sept. 2019 – March 2024, MPI for Intelligent Systems, Ph.D. Thesis: "Self- and Interpersonal Contact in 3D Human Mesh Reconstruction."

Omri Ben-Dov, Sept. 2021 – Sept. 2023, Max Planck Institute for Intelligent Systems, co-supervised with Sergi Pujades and Silvia Zuffi.

Xu Chen, May 2019 – July 2023, MPI-ETH Center for Learning Systems, Ph.D. Thesis: "Learning Clothed 3D Human Models with Articulated Neural Implicit Representations." Co-supervised with Otmar Hilliges and Andreas Geiger.

Qianli Ma, June 2018 – Oct. 2023, International Max Planck Research School, MPI for Intelligent Systems, Ph.D. Thesis "Neural Shape Modeling of 3D Clothed Humans," co-supervised with S. Tang.

Nadine Rüegg, June 2017 – Mar. 2023, MPI-ETH Center for Learning Systems, Ph.D. Thesis "Monocular Shape and Pose Estimation for Humans and Animals," co-supervised with Konrad Schindler and Silvia Zuffi.

Mohamed Hassan, Nov. 2017 – Feb. 2023, MPI for Intelligent Systems, Ph.D. Thesis "Reconstruction and Synthesis of Human-Scene Interaction," Co-supervised with Dimitris Tzionis.

Yinghao Huang, Sept. 2016 – Dec. 2022, Max Planck Institute for Intelligent Systems, Ph.D. Thesis "Whole-Body Motion Capture and Beyond: From Model-Based Inference to Learning-Based Regression," Co-supervised with Dimitris Tzionis.

Vassilis Choutas, May 2018 – Dec. 2022, Ph.D. Thesis "Towards more Realistic Model-Based 3D Human Reconstruction." MPI-ETH Center for Learning Systems, Co-supervised with Luc van Gool and Dimitris Tzionis.

Partha Ghosh, Ph.D. Thesis "Reigning in Deep Generative Models." Nov. 2017 – Nov. 2022, International Max Planck Research School, MPI for Intelligent Systems.

Anurag Ranjan, Ph.D. Thesis "Towards Geometric Understanding of Motion," Jan. 2016 – Dec. 2019, University of Tübingen.

Joel Janai, MPI for Intelligent Systems and University of Tübingen. (joints supervision with Adreas Geiger), Thesis: "Addressing the Data Scarcity of Learning-based Optical Flow Approaches," University of Tbingen, April 2020.

Daniel Cudeiro, Sept. 2017 – Dec. 2016. Deceased.

Jonas Wulff, Ph.D. Thesis: "Model-based Optical Flow: Layers, Learning, and Geometry," Nov. 2011 – Apr. 2018, University of Tübingen.

Matthew Loper, Ph.D. Thesis: "Human Shape Estimation using Statistical Body Models," Mar. 2013 – Mar. 2017, University of Tübingen.

Silvia Zuffi, Ph.D. Thesis: "Shape Models of the Human Body for Distributed Inference," Sept. 2009 – May 2015, Brown University, Dept. of Computer Science.

Aggeliki Tsoli, Ph.D. Thesis: "Modeling the Human Body in 3D: Data Registration and Human Shape Representation," Nov. 2010 – 2014, Brown University, Dept. of Computer Science.

Oren Freifeld, Ph.D. Thesis: "Statistics on Manifolds with Applications to Shape Modeling," Sept. 2009 – Aug. 2013, Brown University, Division of Applied Mathematics.

Peng Guan, Ph.D. Thesis: "Virtual Human Bodies with Clothing and Hair: From Images to Animation," Sept. 2008 – Dec. 2012, Brown University, Dept. of Computer Science.

Deqing Sun, Ph.D. Thesis: "From Pixels to Layers: Joint Motion Estimation and Segmentation," Sept. 2007 – July 2012, Brown University, Dept. of Computer Science.

Payman Yadollahpour, Sept. 2006 – Dec. 2008, Brown University, Dept. of Computer Science; jointly with Gregory Shakhnarovich.

Alexandru Balan, Ph.D. Thesis: "Detailed human shape and pose from images," Jan. 2004 – May 2010, Brown University, Dept. of Computer Science.

Leonid Sigal, Ph.D. Thesis: "Continuous-state graphical models for object localization, pose estimation and tracking," Aug. 2001 – Oct. 2007, Brown University, Dept. of Computer Science.

Frank Wood, Ph.D. Thesis: "Non-parametric Bayesian models of neural data," Jan. 2003 – May 2007, Brown University, Dept. of Computer Science.

Stefan Roth, Ph.D. Thesis: "High-order Markov random fields for low-level vision," Aug. 2001 – May 2007, Brown University, Dept. of Computer Science.

Jessica Fisher, Sept. 2004 – May 2006, Brown University, Dept. of Computer Science.

Wei Wu, Ph.D. Thesis: "Statistical models of neural coding in motor cortex," May 2002 – May 2004, Brown University, Division of Applied Mathematics, jointly with David Mumford.

Hulya Yalcin, Ph.D. Thesis: "Implicit models of moving and static surfaces," March 2002 – May 2004, Brown University, Division of Engineering.

Fernando De la Torre, Ph.D. Thesis: "Robust subspace learning for computer vision," June 1999 – Jan. 2002, La Salle School of Engineering, Universitat Ramon Llull, Barcelona, Spain.

Hedvig C. Sidenbladh, Ph.D. Thesis: "Probabilistic tracking and reconstruction of 3D human motion in monocular video sequences," Apr. 1999 – Nov. 2001, Royal Institute of Technology, Stockholm, Sweden, jointly with Jan-Olof Eklundh.

Shanon X. Ju, Ph.D. Thesis: "Estimating image motion in layers: The Skin and Bones model," Jan. 1994–Jan. 1999, University of Toronto, jointly with Allan Jepson.

Postdoctoral, Research Scientist, and Group Leader Advising

Omid Taheri, MPI for Intelligent Systems, July 2024 – present.

Yandong Wen, MPI for Intelligent Systems, June 2022 – present.

Victoria Fernndez Abrevaya, MPI for Intelligent Systems, Sept. 2020 – present.

Arjun Chandrasekaran, MPI for Intelligent Systems, Jan. 2020 – June 2023.

Timo Bolkart, MPI for Intelligent Systems, Sep. 2016 – May 2023.

Jinlong Yang, MPI for Intelligent Systems, July 2019 – Dec. 2022.

Chun-Hao Paul Huang, MPI for Intelligent Systems, June 2019 – June 2022.

Dimitris Tzionas, MPI for Intelligent Systems, Oct. 2016 – June. 2022.

Aamir Ahmad, MPI for Intelligent Systems, Sept. 2016 – Sept. 2020.

Siyu Tang, MPI for Intelligent Systems, Jan. 2017 – Dec. 2019.

Sergi Pujades, MPI for Intelligent Systems, Jan. 2016 – Nov. 2018.

Alejandra Quiros-Ramirez, MPI for Intelligent Systems, May 2015 – Nov. 2017.

Laura Sevilla, MPI for Intelligent Systems, Feb. 2015 – June 2017.

Naejin Kong, MPI for Intelligent Systems, Jan. 2013 – May 2017.

Ali Osman Ulusoy, MPI for Intelligent Systems, Sept. 2014 – June 2017. Jointly with A. Geiger.

Federica Bogo, MPI for Intelligent Systems, Apr. 2015 – Mar. 2016.

Gerard Pons-Moll, MPI for Intelligent Systems, Sept. 2013 – Dec. 2015.

Ijaz Akhter, MPI for Intelligent Systems, July 2013 – Jan. 2016.

Silvia Zuffi, Bernstein Center for Computational Neuroscience, Univ. of Tübingen, May 2015 – Oct. 2015.

Si Yong Yeo, MPI for Intelligent Systems, July 2013 – July 2015.

Chaohui Wang, MPI for Intelligent Systems, Mar. 2013 – Sept. 2014.

Andreas Geiger, June 2013 – May 2016.

Cristina Garcia Cifuentes, MPI for Intelligent Systems, Jan. 2013 – June 2015.

Søren Hauberg, MPI for Intelligent Systems, Mar. 2012 – Dec. 2013.

Hueihan Jhuang, MPI for Intelligent Systems, Jan. 2012 – Dec. 2013.

Javier Romero, MPI for Intelligent Systems, Feb. 2012 – July 2013.

Juergen Gall, MPI for Intelligent Systems, Aug. 2011 – June 2013.

Sung-Phil Kim, Brown University, Sept. 2005 – Sept. 2008.

Gregory Shakhnarovich, Brown University, Oct. 2005 – Dec. 2007.

Ronan Fablet, Brown University, Sept. 2001 – July 2002.

Thesis Committee Member (partial list)

Christian Diller, "3D Human Behavior Generation through Action and Interaction Synthesis," TU Munich, Oct. 2024.

Michael Strecke, "Object-Level Dynamic Scene Reconstruction With Physical Plausibility From RGB-D Images," Univ. of Tuebingen, Oct. 2023.

Sebastian Starke, "Deep learning for character control," University of Edinburgh, Sept. 2022.

Chaitanya Ahuja, "Communication Beyond Words: Grounding Visual Body Motion with Language," Carnegie Mellon University, March 2022.

Thomas Probst, "Feature Matching and 3D Reconstruction for Anthropometry," ETH Zurich, Aug, 2019.

Nikolas Hesse, "Unobtrusive Medical Infant Motion Analysis from RGB-D Data," Albert-Ludwigs-Universitt Freiburg im Breisgau, 2019.

Miroslova Slavcheva, "Signed Distance Fields for Rigid and Deformable 3D Reconstruction," TUM, Munich, Sept. 2018.

Endri Dibra, "Recovery of the 3D Virtual Human: Monocular Estimation of 3D Shape and Pose with Data Driven Priors," ETH Zürich, May 2018.

Mehmet Turan, "Intelligent Localization and Mapping Methods for Endoscopic Capsule Robots," ETH Zürich, May 2018.

Simone Mölbert, "Body size estimation in eating and weight disorders," Univ. of Tübingen, Apr. 2018.

Fatma Güney, MPI for IS and Univ. of Tübingen, Nov. 2017.

Siyu Tang, "People Detection and Tracking in Crowded Scenes", MPI für Informatik, Sept. 2017.

Benjamin Resch, "Robust and Efficient Camera-based Scene Reconstruction," Univ.

Soumya Ghosh, "Bayesian Nonparametric Discovery of Layers and Parts from Scenes and Objects," Brown University, Apr. 2015.

Katharina Dobs, PhD Advisory committee, Max Planck Institute for Biological Cybernetics, Dec. 2014.

Laura Sevilla, "Long Range Motion Analysis and Applications," University of Massachusetts, Amherst, Sept. 2014.

Mark Homer, "Novel Algorithms for Better Decoding of Neural Signals for Intracortical Brain Computer Interfaces," Brown University, Mar. 2014.

Gerard Pons-Moll, "Human Pose Estimation from Video and Intertial Sensors," Leibniz University, Hannover, Feb. 2014.

Eric Kee, "Photo Forensics from Partial Constraints," Dartmouth College, April 2013.

Matthias Grundmann, "Computational Video: Post-processing Methods for Stabilization, Retargeting, and Segmentation," Georgia Inst. of Technology, April 2013.

Chaohui Wang, "Distributed and higher-order graphical models: Towards segmentation, tracking, matching and 3D model inference," Ecole Centrale Paris, Sept. 2011. Rapporteur.

Tai-peng Tian, "Efficient techniques for parsing humans in images," Boston University, Jan. 2011.

Carlos Vargas-Irwin, "Motor Cortical Control of Naturalistic Reaching and Grasping Actions," Dept. of Neuroscience, Brown University, May 2010.

Matthew Leotta, "Generic, Deformable Models for 3-D Vehicle Surveillance," Division of Engineering, Brown University, Sept. 2009.

Maixme Taron, "Registration & modeling of shapes with uncertainties: Contributions and applications to knowledge based-segmentation," Ecole Nationale des Ponts et Chaussées, Fall 2007. Rapporteur.

Stewart Andrews, Ph.D., "Learning from ambiguous examples," Brown University, Dept. of Computer Science, Fall 2006.

Leonid Taycher, Ph.D., "Coping with uncertain dynamics in visual tracking: Redundant state models and discrete search methods," MIT CSAIL, July 2006.

Morgan McGuire, Ph.D., "Capture and manipulation of single-center, multi-parameter video," Brown University, Dept. of Computer Science, Fall 2005.

Yun Gao, Ph.D., "Statistical models in neural information processing," Brown University, Division of Applied Mathematics, June 2004.

Peng Chang, Ph.D., "Robust tracking and structure from motion with sampling method," Robotics Institute, Carnegie Mellon University, July 2002.

Cristian Sminchisescu, "Estimation algorithms for ambiguous visual models: Three dimensional human modeling and motion reconstruction in monocular video sequences," Ph.D. Inst. National Polytechnique de Grenoble, France, Jul. 2002. Rapporteur.

Cullen Jackson, Ph.D., Brown University, Department of Psychology, Oct. 2001.

François Bérard, "Vision par ordinateur pour l'interaction homme-machine fortement couplé," Ph.D. Joseph Fourier Univ., Grenoble, France, Nov. 1999.

James Davis, M.S. MIT Media Laboratory, July 1996.

Ph.D. Thesis Opponent

Lars Bretzner, Thesis: "Multi-scale feature tracking and motion estimation," Ph.D. Royal Inst. of Tech. (KTH), Sweden, Oct. 1999.

Host for Postdoctoral Researcher

Horst Haussecker, Xerox PARC, July 1999 – June 2000.

Host for Visiting Artist

Pamela Z, PARC Artist in Residence, 1994-1996. Examining the relationship between human motion and music.

Associations Graduate Training Centre of Neuroscience, International Max Planck Research School, MPI for Biological Cybernetics,
European Lab for Learning and Intelligent Systems (ELLIS), Fellow, since 2019.
Member, Excellence Cluster on Machine Learning in Science, Univ. of Tübingen, since 2019.
European Association for Computer Graphics, since 2017.
Intel Network on Intelligent Systems (NIS), since 2017-2020.
Association of Computing Machinery, Member since 2014.
MPI-ETH Center for Learning Systems, Member since 2015.
ETH-MPI Research Network on Learning Systems, Member 2014–2015.
Werner Reichardt Center for Integrative Neuroscience, Eberhard Karls Universität Tübingen: Member since 2011.
Bernstein Center for Computational Neuroscience, Tübingen, since Jan. 2011.
Institute for Electrical and Electronics Engineers: Senior Member: July 2008–present; Member: 1992–2008; Student Member: 1990-1992.
Associate, *Canadian Institute for Advanced Research*, Feb. 2006 – Sept. 2014.
Brain Science Program, Brown University: Member since 2000.
Society for Neuroscience: Member, 2001-2014.
IEEE Engineering in Medicine and Biology Society: Member 2002-2011.
Center for Restorative and Regenerative Medicine, Brown University, 2004-2011.
Brown University Neuroscience Graduate Training Program, Nov. 2005 – Jan. 2008.
Computation and Mathematics of Mind, Brown University: Member 2000–2005

American Association for Artificial Intelligence: Member 1985–2002.
Institute for Robotics and Intelligent Systems (IRIS, Canada): Principal Investigator, 1992–1994.

Patents and Patent Applications (partial list)

[19]   MJ Black, N Ghorbani, *Method and systems for labelling motion-captured points*, US Patent App. 17/949,087, 2023.

[18]   Osman, A., Bolkart, T., Tzionis, D., Black, M., *A Sparse Unified Part-Based Human Representation and related Learning Methods; their Application,* European Patent Application No. 22 196 130.3

[17]   Hesse, N., Pujades, S., Romero, J., Black, M., "Skinned multi-infant linear body model," US Patent 11,127,163, Sept. 2021.

[16]   S. Streuber, M.A. Quiros Ramirez, M. Black, S. Zuffi, A. O'Toole, M. Q. Hill, C. A. Hahn, *Crowdshaping Realistic 3D Avatars with Words,* US Patent 11,282,256 B2, Mar 22, 2022, US Patent 10,818,062 B2, Oct 27, 2020, European Patent Application No. 17701732.4, Granted March 2022.

[15]   Black, M., Rachlin, E., Heron, N., Loper, M., Weiss, A., Hu, K., Hinkle, T., Kristiansen, M., *Machine learning systems and methods of estimating body shape from images,* US Patent 10,679,046, granted June 9, 2020. https://image-ppubs.uspto.gov/dirsearch-public/print/downloadPdf/10679046

   Black, Rachlin, Loper.... Machine learning systems and methods for extracting user body shape from behavioral data US 11,461,630-B1 https://image-ppubs.uspto.gov/dirsearch-public/print/downloadPdf/11461630

[14]   Black, M., Rachlin, E., Lee, E., Heron, N., Loper, M., Weiss, A., Smith, D., *Machine learning systems and methods for augmenting images,* US Patent 10,529,137 B1, granted Jan 7, 2020.

[13]   Black, M.J., Loper, M., Mahmood, N., Pons-Moll, G., Romero, J., *Skinned multi-person linear model,* (SMPL patent), US Patent No. US10395411B2, granted August 27, 2019.

[12]   Loper, M. Mahmood, N. Black, M.J. *Method for providing a three dimensional body model,* (MoSh patent), US-Patent No. 10,417,818, Sept 17, 2019.

[11]   Black, M.J., Romero, J., Loper, M., Zuffi, S., *Human Pose Calculation from Optical Flow Data,* US Provisional 61/869,851 and European patent application EP13181662.1, filed 26 August 2013; allowed June 2017

[10]   Black, M. J. and Guan, P., *System and method for simulating realistic clothing*, US Patent No.: US 9,679,409 B2, June 13, 2017.

[9] Black, M.J., Hirshberg, D., Loper, M., Rachlin, E., Weiss, A., *Co-Registration – Simultaneous Alignment and Modeling of Articulated 3D Shapes*, European patent application EP12187467.1 and US Provisional Application, filed Oct. 5, 2012.

[8] Black, M. J., Freifeld, O., Weiss, A, Loper, M., Guan, P., *Parameterized Model of 2D Articulated Human Shape,* US 11,501,508 B2, Nov 15, 2022 https://image-ppubs.uspto.gov/dirsearch-public/print/downloadPdf/11501508

[7] Black, M. J., Balan, A., Weiss, A., Sigal, L., Loper, M., St Clair, T., *Method and Apparatus for Estimating Body Shape*, US (12/541,898) and PCT patent application, filed August 14, 2009; first divisional application issued 9,189,886, issued November 17, 2015.

[6] Jepson, A. D., Fleet, D. J., and Black, M. J., *Visual motion analysis method for detecting arbitrary numbers of moving objects in image sequences*, US Pat. 6,954,544, Oct. 11, 2005.

[5] Black, M. J., Ju, S., Minneman, S., and Kimber, D., *Method and apparatus for generating a condensed version of a video sequence including desired affordances*, US Pat. 6,560,281, May 6, 2003.

[4] Black, M. J. and Jepson, A. D., *Apparatus and method for identifying and tracking objects with view-based representations*, US Pat. 6,526,156, Feb. 25, 2003.

[3] Black, M. J. and Yacoob, Y., *Apparatus and method for tracking facial motion through a sequence of images*, US Pat. 5,802,220, Dec. 15, 1995.

[2] Black, M. J. and Yacoob, Y., *Apparatus and method for recognizing facial expressions and facial gestures in a sequence of images*, US Pat. 5,774,591, Dec. 15, 1995.

[1] Black, M. J. and Jepson, A. D., *Image segmentation using robust mixture models*, US Pat. 5,802,203, June 7, 1995.

Software   Robust dense optical flow and robust affine motion code (aka "Black and Anandan").Publication date: November The software was one of the first reliable methods for computing optical flow and was consequently widely used. The code was licensed to a major corporation and was used in the making of a number of popular movies including for the Academy Award Winning effects in "What Dreams May Come" and "The Matrix Reloaded."

Thesis   *Robust Incremental Optical Flow*, Advisers: P. Anandan and D. V. McDermott, Yale University, Department of Computer Science, Research Report YALEU/DCS/RR-923, 1992.

Journal Publications

[94] Xiu, Y., Liu, Z., Tzionas, D., Black, M. J., "PuzzleAvatar: Assembling 3D Avatars from Personal Albums," *ACM Transactions on Graphics,* 43(6), ACM, December 2024.

[93] Peter Kulits, Haiwen Feng, Weiyang Liu, Victoria Fernandez Abrevaya, and Michael J. Black, "Re-Thinking Inverse Graphics With Large Language Models," *Transactions on Machine Learning Research*, August, 2024.

[92] Jiankai Sun, Bolei Zhou, Michael J. Black, and Arjun Chandrasekaran, "LocATe: End-to-end Localization of Actions in 3D with Transformers," *Nature Communications Engineering,* 2024.

[91] Paolo Meneguzzo, Simone Claire Behrens, Chiara Pavan, Tommaso Toffanin, M. Alejandra Quiros-Ramirez, Michael J Black, Katrin Giel, Elena Tenconi and Angela Favaro, "Exploring Weight Bias and Negative Self-Evaluation in Patients with Mood Disorders: Insights from the BodyTalk Project," Frontiers in Psychiatry, section Psychopathology, 2024.

[90] Ci Li, Ylva Mellbin, Johanna Krogager, Senya Polikovsky, Martin Holmberg, Nima Ghorbani, Michael J. Black, Hedvig Kjellstrm, Silvia Zuffi and Elin Hernlund, "The Poses for Equine Research Dataset (PFERD)," *Nature Scientific Data* volume 11, Article number: 497 (2024)

[89] Huang, Y., Taheri, O., Black, M.J., Tzionas, D., "InterCap: Joint Markerless 3D Tracking of Humans and Objects in Interaction from Multi-view RGB-D Images." Int. J. of Computer Vision (IJCV), to appear, 2024.

[88] Marilyn Keller, Keenon Werling, Soyong Shin, Scott Delp, Sergi Pujades, Karen Liu, Michael J. Black, "From Skin to Skeleton: Towards Biomechanically Accurate 3D Digital Humans," *ACM Trans. on Graphics (TOG), Proc. SIGGRAPH Asia,* 42(6), Number 253, pp. 112, Dec. 2023.

[87] Shrisha Bharadwaj, Yufeng Zheng, Otmar Hilliges, Michael J. Black, Victoria Fernandez Abrevaya, "FLARE: Fast Learning of Animatable and Relightable Mesh Avatars," Conditionally accepted to *Proc. SIGGRAPH Asia,* Dec. 2023. *ACM Trans. on Graphics (TOG), Proc. SIGGRAPH Asia,* 42(6), Number 204, pp. 115, Dec. 2023.

[86] Simone C. Behrens, Joachim Tesch, Philine J. B. Sun, Sebastian Starke, Michael J. Black, Hannah Schneider, Jacopo Pruccoli, Stephan Zipfel, Katrin E. Giel, "Virtual reality exposure to a healthy weight body is a promising adjunct treatment for anorexia nervosa," *Psychotherapy and Psychosomatics.* 92(3):170–179, June 2023.

[85] Nadine Rueegg, Silvia Zuffi, Konrad Schindler, Michael J. Black, "BARC: Breed-Augmented Regression Using Classification for 3D Dog Reconstruction from Images," *Int. J. Computer Vision*, 131(8):19641979, April, 2023.

[84] Xu Chen, Tianjian Jiang, Jie Song, Max Rietmann, Andreas Geiger, Michael J. Black, Otmar Hilliges, "Fast-SNARF: A Fast Deformer for Articulated Neural Fields," *IEEE Trans. on Pattern Analysis and Machine Intelligence (PAMI)*, pp. 1-15, April 2023.

[83] Eric Price, Michael Black, Aamir Ahmad, "Viewpoint-driven Formation Control of Airships for Cooperative Target Tracking," *IEEE Robotics and Automation Letters*, 8(6):3653-3660, 2023. Also Proc. IROS 2023.

[82] Nitin Saini, Chun-Hao Paul Huang, Michael Black, Aamir Ahmad, "SmartMocap: Joint Estimation of Human and Camera Motion using Uncalibrated RGB Cameras," *IEEE Robotics and Automation Letters*, 8(6):3206-3213, 2023. Also Proc. IROS 2023.

[81] Saini, N., Bonetto, E., Price, E. Ahmad, A., and Black, M. J., "AirPose: Multi-View Fusion Network for Aerial 3D Human Pose and Shape Estimation," *IEEE Robotics and Automation Letters,* 7(2):4805-4812, April 2022; also appears in *Proceedings of the 2022 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2022).*

[80] Bonetto, E., Goldschmid, P., Pabst, M., Black, M.J., and Ahmad, A. "iRotate: Active visual SLAM for omnidirectional robots2022Articleps," *Robotics and Autonomous Systems,* 2022 https://www.sciencedirect.com/science/article/pii/S0921889022000550

[79] Wong, M.C., Ng, B.K., Tian, I., Sobhiyeh, S., Pagano, I., Dechenaud, M., Kennedy, S.F., Liu, Y.E., Kelly, N.N., Chow, D., Garber, A.K., Maskarinec, G., Pujades, S., Black, M.J., Curless, B., Heymsfield, S.B., Shepherd, J.A., "A Pose Independent Method for Accurate and Precise Body Composition," *Obesity,* 29(11):1835-1847, Nov. 2021.

[78] Foster, Celia; Zhao, Mintao; Bolkart, Timo; Black, Michael; Bartels, Andreas; Blthoff, Isabelle. "Separated and overlapping neural coding of face and body identity," on-line: *Human Brain Mapping*, 42(13):4242–4260, Sept. 2021.

[77] Maria Alejandra Quiros Ramirez, Stephan Streuber, and Michael Black, "Red Shape, Blue Shape: Political ideology influences the social perception of body shape," *Nature Humanities and Social Sciences Communications,* 8(148), 2021.

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Was, DEN wählst du? Spiegel, Aug. 6, 2024.

Filmmakers say AI will change the art perhaps beyond recognition, TechCrunch, Aug. 2024.

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Mitforschen statt zuschauen, Spiegel, StarkesLand, Baden-Württemberg, June 2020.

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ARD Nachtmagazin, Television report on the start of the Cyber Valley Initiative, Dec. 15, 2016.

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"Is A More Jiggly Animation A More Realistic Animation?" Fast Company, Dec. 16, 2014.

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"How A Murder Led To "The World's Most Advanced" Body & Scanning Technology," Fast Company - Nov 13, 2014

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> "Many uses seen for software that lays bare our 3-D selves," *Boston Globe*, Nov.3 2008.
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MSNBC, "The Science of Art," interview regarding the PARC Artist in Residence program, April 10, 1997.

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Keynote Talks "Learning digital humans for the Metaverse,"

> Keynote, *Int. Conf. on 3D Vision (3DV)*, Dec. 2021.

"Building digital humans by scanning real ones,"

> Keynote, *13th European Conference on Visual Media Production (CVMP)* London, Dec. 12–13, 2016.

"On building digital humans,"

> Keynote Lecture, *Animation Studies Summer School,* Tübingen, Germany, Sep. 2015.

"How and why to learn a 3D model of the human body,"

> Keynote Lecture, *12th IEEE Int. Conf. on Advanced Video and Signal-based Surveillance, AVSS*, Karlsruhe, Germany, Aug. 2015.

"4D capture, modeling and animation of human soft-tissue motion,"

> Keynote speaker, *Kinovis Inaugural Workshop*, INRIA, Grenoble Rhône-Alpes, May 26, 2015.

"Visions of motor control: From motion capture to the cortical control of movement,"

> Plenary, *Int. Conf. on Robotics and Automation (ICRA)*, Karlsruhe, Germany, May 2013.

"Modernizing Muybridge: From 3D models of the body to decoding the brain,"

> Keynote, *Svenska Sällskapet för Automatiserad Bildanalys (Swedish Society for Automated Image Analysis, SSBA)*, KTH, Stockholm, March 2012.

"On modeling bodies and brains: From 3D models to decoding the brain,"

Keynote, *Vision, Modeling and Visualization Workshop*, October 4–6, 2011, Berlin.

"Human activity understanding: Observing the body and the brain,"

Keynote, *International Workshop on Human Activity Understanding from 3D Data*, Colorado Spring, June 24, 2011.

"Learning to see people,"

Keynote, *21st International Conference on Machine Learning*, Banff, Alberta, July 4–8, 2004.

"Connecting brains with machines: Towards the neural control of robotic devices,"

Keynote, *EURON, European Robotics Research Network*, Annual Meeting, Lisbon, Portugal, Jan. 2003.

"Stochastic tracking of humans,"

Keynote speech, *Vision Interface 2000*, May 15–17, 2000, Montreal, Canada.

Conference/Workshop/Summer-School/Tutorial/Webinar Presentations

"Towards the 3D Human Foundation Agent,"

SIGGRAPH Asia 2024 pre-conference workshop, University of Tokyo, Dec. 2024.
Foundation Models for 3D Humans, ECCV Workshop, Oct. 2024.

"Learning digital humans that act and interact,"

International Computer Vision Summer School (ICVSS), Sicily, July 2024.

"A history of human motion in Computer Vision: From puppets to large language models,"

CV 20/20 A Retrospective Vision, CVPR Workshops, Seattle, June 2024.

"Capturing and understanding 3D human-object interaction,"

Reconstruction of Human-Object Interactions (RHOBIN), CVPR Workshops, Seattle, June 2024.

"Towards the 3D human foundation agent,"

Social Presence with Codec Avatars, CVPR Workshops, Seattle, June 2024.

"Towards the 3D human foundation agent,"

Workshop on New Challenges in 3D Human Understanding, CVPR Workshops, Seattle, June 2024.

"Title 1: Why Sora solves everything. Title 2: Why Sora doesnt solve everything. Yet. Title 3: Why LLMs havent killed graphics and may never."

ELLIS Computer Vision Workshop, Modena, Italy, April 2024. Champagne, France, Oct. 2023.

"The 3D Human Capture-Learning-Synthesis Flywheel,"

Computer Vision for Small Data (CV4Smalls) Workshop, WACV 2024.
Scenes from Video (SfV), V, Champagne, France, Oct. 2023.

"Implicit, Explicit, Real, and Synthetic: Spinning the Virtual Fashion Flywheel,"

3D Vision and Modeling Challenges in eCommerce, ICCV 2023 Workshop, Paris, Oct. 2023.

"Learning Digital Humans that Act and Interact,"

FMX Conference on Animation, Effects, Games and Transmedia, Stuttgart, Germany, May, 2023.

"The Unique Risks and Opportunities of Academic Startups,"

Industry Track , ECCV 2022 Workshop, Tel Aviv, Israel, Oct. 24, 2022.

"The Age of Avatars is Coming,"

Computer Vision for the Metaverse, ECCV 2022 Workshop, Tel Aviv, Israel, Oct. 24, 2022.

"The Langurage of 3D Human Shape and Motion,"

Language for 3D Scenes, ECCV 2022 Workshop, Tel Aviv, Israel, Oct. 23, 2022.

"Buffy, Lola, and Phil: Looking backwards and forwards at people in video,"

Andrew Zisserman Festschrift, Oxford, UK, Sept. 1, 2022.

"The Age of Avatars is coming to Content Creation,"

AI for Content Creation, workshop at CVPR, June 19, 2022.

"Meta-commerce in the Age of Avatars,"

Retail Vision, workshop at CVPR, June 19, 2022.

"Towards Implicit Fashion,"

Fourth Workshop on Computer Vision for Fashion, Art, and Design, at CVPR, June 25, 2021.

"Putting realistic people in realistic scenes doing realistic things,"

Human-Centric Synthetic Data: Research & Applications, Webinar, Mar. 1, 2021.

""Expressive human models for communication and interaction."

Facebook Video Summit, Los Angeles, June 2019,
3D Morphable Models, Dagstuhl Seminar, Mar., 2019.

""Estimating Human Motion: Past, Present, and Future."

40 Years DAGM - Invited Talks, GCPR 2018, Stuttgart, Oct. 2018.

"What is optical flow for? On prediction, persistence, and structure."

Workshop on What is Optical Flow For? ECCV, Munich, Sept. 2018.

"Learning to be a Digital Human,"

9th Int. Workshop on Human Behavior Understanding, ECCV, Munich, Sept. 2018.

"The Digital Body: Capturing, Modelling and Animating Realistic 3D Human Avatars,"

Beijing Film Academy Round Table, Simon Fraser Univ., Vancouver, Aug. 2018.

"The Digital Body: Capturing, Modelling and Animating Realistic 3D Humans,"

Lecture Series on "What Beings are We?" Institute for Art and Architecture, IKA, Vienna, Austria, May 2018.

"Tracking humans: Past, present, and future,"

PoseTrack Challenge Workshop, ICCV, Venice, Italy, Oct. 2017.

"3D human shape, pose, and motion from video,"

Frontiers of Video Technology, Adobe, San Jose, CA, July 2017.

"Learning digital humans by capturing real ones,"

PeopleCap Workshop, ICCV, Venice, Italy, Oct. 2017,
Machine Learning Summer School (MLSS), Tübingen, June 2017.

"Building digital humans by capturing real ones,"

Amazon Machine Learning Conference, Seattle, May 2017.

"Human body shape modeling: A tutorial,"

Invited Tutorial: European Conference on Computer Vision and the ACM Multimedia Conference, Amsterdam, Oct. 2016.

"Generative Models Meet Deep Learning A Case Study of Human Shape and Pose,"

ECCV Workshop on Geometry Meets Deep Learning, Amsterdam, Oct. 2016.

"On the Motion of Pixels and Objects: Video segmentation and optical flow"

The Second International Workshop on Video Segmentation, at ECCV, Amsterdam, Oct. 2016.

"The future of generative models: A case study of human bodies in motion,"

Int. Computer Vision Summer School, ICVSS, Sicily, July 2016.

"On building digital humans,"

CVPR 2016 Area Chair Workshop, Simon Fraser Univ., Vancouver, Feb. 2016,
Shape Analysis and Learning by Geometry and Machine, Inst. for Pure and Applied Mathematics (IPAM), UCLA, Feb. 2016,
Computational Vision Summer School, Freudenstadt-Lauterbad (Black Forest), July 2015,
Machine Learning Summer School, Tübingen, July 2015.

"Estimating 3D human pose and shape using differentiable rendering,"

Inverse Rendering Workshop, ICCV, Santiago Chile, Dec. 2015.

"The Mathematics of Body Shape – The Secret Lives of Triangles in Hollywood,"

Science Notes, WAHRnehmung in Tübingen, May 7, 2015.

"How to Build a Digital Human,"

FMX Conference on Animation, Effects, Games and Transmedia, Stuttgart, Germany, May 05-08, 2015.

"Video Segmentation: What should the answer be?"

Panelist, *First Int. Workshop on Video Segmentation*, with ECCV'14, Zürich, Sept. 2014.

"Grassmann averages for scalable robust PCA,"

4th Int. Workshop on Computer Vision, Alghero, Italy, May 2014.

"Computing Optical Flow: The 'good parts' version,"

ETH/MPI Research Network on Learning Systems, Summer School, Zürich, June 2014,
Machine Learning Summer School, Max Planck Campus, Tübingen, Sept. 2013.

"MPI-Sintel: From animation to evaluation of optical flow,"

ECCV 2012 Workshop on Unsolved Problems in Optical Flow and Stereo Estimation, Oct. 12, Florence Italy.

"Modernizing Muybridge: From 3D models of the human body to decoding the brain,"

Sensory Coding & Natural Environment, IST Austria, Sept. 2012.

"A naturalistic film for optical flow evaluation,"

At the intersection of Vision, Graphics, Learning and Sensing – Representations and Applications Workshop, Cambridge, May 2012.

"Thinking about movement: Decoding the brain to restore lost function,"

Inaugural Symposium: New Perspectives in Integrative Neuroscience, Hertie Institute, Tübingen, May 2012.

"On modeling and estimating human body shape,"

Rank Prize Symposium on Machine Learning and Computer Vision, Grasmere, UK, March 26–29, 2012.

"Modernizing Muybridge: From 3D models of the body to decoding the brain,"

Bernstein Cluster C Symposium, *Bayesian Inference: From Spikes to Behaviour*, Tübingen, December 9 - 10, 2011.

"From Muybridge to a brain-computer interface: A computational investigation of animal movement,"

Technion Computer Engineering (TCE) Inaugural Conference, June 1-5, 2011.

"Recognizing transparent objects,"

Canadian Institute for Advanced Research, Neural Computation and Adaptive Perception Program Meeting, Vancouver, Dec. 2009.

"Estimating human body shape under clothing,"

Workshop on Trends in Computer Vision, JOE'70, Prague, July 2009.

"Inferring 3D human body shape from images and video,"

International Computer Vision Summer School, ICVSS, Sicily, July 2009.

"Body shape from video,"

International Workshop on Video, Barcelona, May 2009.

"Estimating human shape under clothing,"

Israeli Vision Day, I.D.C., Herzliya, Israel, Dec. 2008.

"Learning models of optical flow,"

Canadian Institute for Advanced Research, Neural Computation and Adaptive Perception Program Meeting, Vancouver, Dec. 2008.

"Optical flow and random fields: History and future,"

Workshop on MRFs in Computer Vision, Downing College, Cambridge. Oct. 2008.

"Sauna vision: Estimating the shape and pose of people in minimal clothing,"

The 2008 Stockholm Workshop on Computational Vision, Rosenön, Sweden, Aug. 2008.

"Detailed human shape and pose from images"

ECCV'08 Area Chair Workshop, Ecole Normale Supérieure, Paris, June 2008.
CVPR'08 Area Chair Workshop, Univ. of Central Florida, March 2008.

"Markerless human motion capture: Status and prospects"

> *Int. Workshop on Computer Vision,* Venice, Italy, May 2008.

"Can Markov random fields tell us anything about visual receptive fields?"

> *Beyond Simple Cells: Probabilistic models for visual cortical processing,* NIPS 2007 workshop, Whistler, BC, Dec. 2007.

"Fields of Experts: High-order Markov random field models of natural scenes,"

> *6th Int. Conf. on Energy Minimization Methods in Computer Vision an Pattern Recognition*, EMMCVPR, Ezhou, Hubei, China, Aug. 2007.
> *4th Canadian Conference on Computer and Robot Vision*, CRV, Montreal, May 2007.
> *5th Indian Conference on Computer Vision, Graphics and Image Processing, ICVGIP*, Madurai, India, December 2006.

"Robust statistics, flow statistics and the estimation of optical flow,"

> "Vision Shindig," *Microsoft Research*, Bangalore, India, December 2006.

"Random fields and random wiring: On probabilistic models of natural images and cortical coding,"

> International Symposium on Vision by Brains and Machines, Montevideo, Uruguay, November 13–17, 2006.

"Receptive fields, Markov random fields and probabilistic models of natural images,"

> Gordon Conference on Sensory Coding and the Natural Environment, Big Sky, Montana, Aug. 27 – Sept. 1, 2006.

"Bayesian denoising of archival films,"

> IMA Workshop W2.6-10.06, Institute for Mathematics and its Applications, University of Minnesota, Workshop on The Mathematics and Art of Film Editing and Restoration, February 6-10, 2006.

"Robust statistics, image statistics and the estimation of optical flow,"

> Canadian Institute for Advanced Research, *Workshop on Neural Computation and Adaptive Perception,* Vancouver, BC, Dec. 2005.

"Probabilistic models of the neural code for neural prosthetic control,"

> *STEP Brain-Machine Interface Technology Workshop,* Mitre Crop., MacLean, VA, July 2005.

"Neural motor prostheses: Directly coupling brains and machines to restore lost function,"

> *International Symposium on the Art of Statistical Metaware,* Tokyo, Japan, Mar. 2005.

"Fields of experts: A framework for learning image priors,"

MSRI Workshop on Learning and Inference in Low and Mid Level Vision, Feb. 2005.

"3D markerless motion capture (evaluation, reactions and directions),"

Rank Prize Workshop, "Machine understanding of people and their responses," Grasmere, UK, Jan. 31 – Feb. 3, 2005.

"Video-based human motion capture: Problems and directions,"

Learning in Graphics and Vision, Workshop at NIPS, Whistler, BC, Dec. 18, 2004.

"Probabilistic decoding for a neural motor prosthesis,"

Towards Brain Computer Interfacing, Workshop at NIPS, Whistler, BC, Dec. 17, 2004.

"Inferring people from images,"

International Symposium on Representation of Reality by Brain and Machines: Crossed Views from Neuroscience and Computer Vision, Nov. 2004, Montevideo, Uruguay.

"Probabilistic decoding of motor cortical activity for neural motor prostheses,"

International Symposium on Representation of Reality by Brain and Machines: Crossed Views from Neuroscience and Computer Vision, Nov. 2004, Montevideo, Uruguay.

"Estimating human motion,"

First International Workshop on Complex Motion, Oct. 2004, Schloss Reisenburg, Günzburg Germany.

"From uncertain spikes to prosthetic control,"

Statistical Analysis of Neuronal Data, SAND2, Pittsburgh, PA, May 21–22, 2004.

"Moving on: Trends in the estimation of visual motion,"

Machine Vision Face to Face, Intel Research, Santa Clara, CA, May 20, 2004.

"Inferring people from images,"

Open Challenges in Cognitive Vision , Workshop at NIPS, Whistler, BC, Dec. 13, 2003.

"Bayesian decoding of motor cortical activity,"

Case studies in Bayesian Statistics Workshop 7, Carnegie Mellon University, Pittsburgh, Sept. 12–13, 2003.

"Inferring 3D people from 2D images,"

19th Conference on Uncertainty in Artificial Intelligence, UAI-2003, Acapulco, Mexico, Aug 8-10, 2003.

"People from pictures: Past, present, and future,"

The 2003 Stockholm Workshop on Computational Vision, Rosenön, Sweden, July 2003.

"Connecting brains with machines: The neural control of 2D cursor movement,"

Plenary talk, *1st International IEEE EMBS Conference on Neural Engineering*, March 20–22, 2003, Capri Italy.

"Models of neural coding in motor cortex and their application to neural prostheses,"

Plenary talk, *Mathematical Biosciences Institute,* workshop on Neural Coding, Feb 10–14, 2003.

"Learning the appearance and motion of people in video,"

One-day Workshop on Computer Vision, INRIA Rhône-Alpes, Grenoble, France, Jul. 2002.
Workshop of the ECCV Area Chairs , Lund Univ., Sweden, Feb. 2002.

"Overview of brain-computer interface research at Brown,"

Directions in Brain-Computer Interface (BCI) Research, Whistler, BC, Dec. 7, 2001.

"Smoke & mirrors: Grand challenges in motion imagery,"

Defining a Motion Imagery Research and Development Program Workshop, Herndon, VA, Nov. 28-30, 2001.

"Probabilistic inference of hand motion from neural activity in motor cortex,"

The 2001 Stockholm Workshop on Computational Vision, Rosenön, Sweden, July 30 – August 2, 2001.

"Learning what people look like,"

Workshop on the Convergence of Vision, Video, and Graphics, March 28-30, 2001, Berkeley, CA.

"Beyond perceptual user interfaces: Brain-computer interfaces,"

Workshop on Vision-Based Perceptual Interfaces, March 19, 2001, Interactive Institute, Stockholm, Sweden.

"Probabilistic modeling of neural activity for brain-computer interfaces,"

Microsoft Research Vision Symposium, March 5–6, 2001, Redmond, WA.

"Understanding human behavior,"

Panel presentation, *IEEE Human Modeling, Analysis and Synthesis Workshop*, Hilton Head, June 2000.

"Stochastic tracking of human motion,"
Beckman Institute Computer Vision Workshop, February 14–15, 2000, Urbana, IL.

"Generic recognition of human activity,"
2nd IEEE Workshop on Generic Object Recognition, September 26, 1999, Corfu, Greece.

"Motion: From estimation to explanation,"
IEEE Computer Society Workshop on The Interpretation of Visual Motion, Santa Barbara, June 1998.

"Human motions and computer interfaces,"
ECCV'98 Workshop on Perception of Human Action, Freiburg Germany, June 1998.

"The vision frontier in the early detection of breast cancer,"
New Frontiers in Breast Cancer Imaging and Early Detection, Washington D.C., July 1994.

"Robust tracking of multiple affine motions,"
IRIS–PRECARN III Annual Conference, Ottawa, June 1993.

"Optic flow and motion discontinuities over long image sequences: Experimental results,"

Panelist: Experimental Session on Optic Flow, *IEEE Workshop on Visual Motion*, Princeton, NJ, Oct. 1991.

"Optic flow and nap of the earth helicopter flight,"
Workshop on Motion and Autonomous Navigation, NASA Ames Research Center, July 1990.

Invited Talks   "Towards the 3D Human Foundation Agent,"
Workshop in honor of Gül Varol's Habilitation, *Institut Henri Poincaré*, Paris, Nov. 2024.
SCIEN Seminar, *Stanford University*, May 2024,
Apple, Cupertino, CA, May 2024.

"The 3D Human Capture-Learning-Synthesis Flywheel,"
Meta Reality Labs, Sausalito, CA, Mar. 2024,
Nvidia, Santa Clara, CA, Mar. 2024,
University of California, Berkeley), CA, Oct. 2022.

"Learning digital humans that act and interact,"
> *Stanford University*, Neuromuscular Biomechanics Lab, Dec. 2023.
> *Royal Institute of Technology (KTH)*, Stockholm, Sweden, Aug. 2023.

"Learning digital humans for the Metaverse,"
> *University of California, Berkeley)*, CA, Oct. 2022.

"Towards putting realistic people in realistic scenes doing realistic things,"
> *TUM AI Lecture Series*, on-line, April 2021.

"Expressive human models for communication and interaction,"
> *Nvidia*, Toronto, May 2019, *Uber ATG*, Toronto, May 2019, *Samsung AI Lab*, Toronto, May 2019.

"Human shape, pose, and motion, from images, video, and more,"
> *Univ. of Washington*, Seattle, Mar. 2018.

"Building digital humans by scanning real ones,"
> *Uber*, AI distinguished speaker series, San Francisco, Feb. 2017.

"On building a digital human,"
> *A9 (Amazon),* Palo Alto, CA, Feb. 2016,
> *Oculus Research,* Redmond, WA, Feb. 2016,
> *Stanford AI Lab,* Distinguished Speaker Series, Jan. 2016,
> *TU Darmstadt*, Nov. 2015,
> *Univ. of Basel, Dept. Math. und Informatik*, Basel, Switzerland, Sept. 2015,
> *Dreamworks,* Los Angeles, CA Aug. 2015,
> *Technical University of Denmark, DTU Compute*, Copenhagen, May 2015.

"How to build a digital human,"
> *University of Edinburgh*, Edinburgh, Scotland, May 2015.

"How and why to learn a 3D model of the human body,"
> *Intel Corp.*, Santa Clara, CA, Jan. 2015,
> *ebay*, San Jose, CA, Aug. 2014,
> *Microsoft Research*, Redmond, WA, Aug. 2014.

"Learning bodies in motion,"
> *University College London*, Dept. of Computer Science, Nov. 2014, *Industrial Light and Magic*, San Francisco, CA, Aug. 2014.

"The persistence of structure: Layers, time, and the estimation of optical flow,"
> *MPI for Informatik*, Saabrücken, July 2014,
> *Oxford University*, Robotics Research Group Seminar, Feb. 2014,
> *Microsoft Research*, Cambridge UK, Jan. 2014,
> *Univ. of California at Berkeley*, Computer Vision Metting, Dec. 2013.

"The Mathematics of Body Shape,"

CIN-MPI Body Perception seminar, Tübingen, July 2012.

"Modernizing Muybridge: From 3D models of the body to decoding the brain,"

Gatsby Computational Neuroscience Unit, Univ. College, London, Jan. 2012,
Oxford University, Robotics Research Group Seminar, Jan. 2012.

"Modeling bodies and brains: From computer vision to neural prostheses,"

Wilhelm Schickhard Institute for Computer Sciences, Eberhard Karls University, Tübingen, Germany, July 2011.

"An additive latent feature model for transparent object recognition,"

Machine Learning Seminar, Univ. of Toronto, Jan. 2010.

"Decoding the human brain for neural prosthetic control,"

Univ. of Washington, Dept. of Computer Science, Seattle, WA, April 2010,
Max Planck Inst. for Biological Cybernetics, Tübingen, Germany, April 2009.

"Detailed human shape and pose from images"

ETH, Zurich, Switzerland, Oct. 2010,
Microsoft Research, Redmond, WA, April 2010,
Dept. of Computer Science, UC Santa Barbara, CA, Feb. 2010,
US Army Natick Soldier RD&E Center, Natick, MA, July 2009,
Air Force Research Lab., Wright-Patterson Air Force Base, Dayton, May 2009,
Florida State Univ., Dept. of Statistics, Mar. 2009,
Univ. of Southern California, Dept. of Comp. Sci. Feb. 2009,
Google, Tech Talk, New York, NY, Oct. 2008,
Univ. of British Columbia, Dept. of Computer Science, Vancouver, Aug. 2008,
Georgia Inst. Tech., Center for Robotics and Intelligent Machines, Feb. 2008,
Google, Tech Talk, Mountain View, Jan. 2008,
Technion, Dept. of Computer Science, Haifa, Israel, Jan. 2008,
Weizmann Inst. of Science, Rehovot, Israel, Jan. 2008,
University of Oxford, Engineering, Visual Geometry Group, Nov. 2007,
Microsoft Research, Cambridge, UK, Nov. 2007,
Ecole Normale Supérieure, Département d'Informatique, Paris, Nov. 2007.

"Learning models of optical flow,"

Weizmann Inst. of Science, Rehovot, Israel, Dec. 2008.

"Predicting human body shape under clothing"

Tech. Univ. Darmstadt, Darmstadt, Germany, Dec. 2008,
Willow Garage, Menlo Park, CA, Nov. 2008,
Univ. of California at Berkeley, Vision Seminar, Nov. 2008.

"The development of a human neural interface system: Recent results"

Hebrew University, Dept. of Physiology, Jerusalem, Israel, Jan. 2008.

"Directly connecting brains and machines: The development of a human neural interface system,"

> *Tel Aviv University*, Dept. of Electrical Engineering, Tel Aviv, Israel, Jan. 2008,
> *The Gerard Salton Lecture*, Cornell University, Dept. of Computer Science, Sept. 2007.

"Restoring movement to the severely disabled with a neural motor interface,"

> *Univ. of British Columbia*, Dept. of Computer Science, Vancouver, May 2007.

"Fields of Experts: High-order Markov random field models of natural scenes,"

> *Hebrew University*, Comp. Sci. & Eng., Jerusalem, Israel, Jan. 2008,
> *Oxford Brookes University*, Oxford, Nov. 2007
> *Cornell University*, AI Seminar Series, Dept. of Computer Science, Sept. 2007,
> *Hong Kong Univ. of Science and Technology*, Dept. of Computer Science and Engineering and Dept. of Electronic and Computer Engineering, August 2007.
> *Univ. of British Columbia*, Dept. of Computer Science, Vancouver, May 2007.
> *Stanford Univ.*, The Probabilistic AI Lunch, October 2006.

"Building the bionic body: Restoring movement to the severely disabled with a brain-machine interface,"

> *National Hellenic Research Foundation,* Public lecture series on Health and Society, Athens, Greece, November 2006.

"Repairing the damaged brain with computation: The development of a neural motor prosthesis,"

> *Dertouzos Lecturer Series*, MIT, CSAIL, April 2006,
> *National Technical University of Athens*, June 2006.

"Bayesian denoising of archival films,"

> *Intel Research*, Santa Clara, CA, March 2006.

"Fields of experts: A framework for learning image priors,"

> *Royal Institute of Technology (KTH)*, CVAP, Stockholm, Sweden, Sep. 2005.

"Neural Motor Prostheses: Directly Coupling Brains and Machines to Restore Lost Function,"

> *German Aerospace Center*, DLR, Oberpfaffenhofen, Germany, Jan. 2006,
> *Salk Institute*, La Jolla, CA, June 2005,
> *Univ. of Maryland*, Dept. of Computer Science, Apr. 2005,
> *Gatsby Computational Neuroscience Unit,* Univ. College, London, Feb. 2005,
> *Karolinska Inst.*, Nobel Inst. for Neurophys., Stockholm, Sweden, Jan. 2005,
> *Oxford University*, Robotics Research Group Seminar, Dec. 2004,
> *York University*, Computer Science and Engineering Seminar Series, Nov. 2004,
> *Carnegie Mellon*, Robotics Institute Seminar, Sept. 24, 2004.

"Inferring 3D people from 2D images,"

> *Royal Institute of Technology (KTH)*, CVAP, Stockholm, Sweden, Jan. 2005,
> *Johns Hopkins University*, Center for Imaging Science, April 20, 2004.

"The probabilistic inference of 3D human motion,"

> *Columbia Univ.*, Vision and Graphics Center, Distinguished Lecture Series,
> Apr. 2003.

"Connecting brains with machines: Towards the neural control of 2D cursor movement,"

> *McGill Univ.*, Center for Intelligent Machines Seminar, Montreal, April 2003,
> *Siemens Corp. Research*, Distinguished Seminar Series, Princeton, Apr. 2003,
> *Ohio State University*, Electrical Engineering Colloquium, Feb. 2003,
> *MIT*, AI Lab Colloquium, Oct. 2002,
> *Middlebury College.*, Dept. of Math. and Comp. Science, Oct. 2002.

"Connecting brains with machines: Intel inside your brain?"

> *Intel Corp.*, Microprocessor Research Labs (MRL), Santa Clara, Media Graphics Seminar, Mar. 2002.

"Connecting brains with machines: The probabilistic inference of hand motion from neural activity,"

> *Signals, Sensors, and Systems*, KTH, Stockholm, Feb. 2002,
> *La Salle School of Engineering*, Barcelona, Catalonia, Jan. 2002.

"The man who mistook his computer for a hand: The neural control of robotic devices,"

> *Royal Institute of Technology (KTH)*, Stockholm, Sweden, Nov. 2001.

"Learning the appearance and motion of people in video,"

> *Middlebury College*, Computer Vision (CX 336), guest lecture, Oct. 2002.
> *University of Toronto*, Vision group, Dept. of Computer Science, Nov. 2002,
> *Siemens*, SRC Distinguished Seminar Series, Princeton, NJ, Aug. 2002,
> *Yale University*, Dept. of Computer Science, Feb. 2002,
> *University of Rochester*, Dept. of Computer Science, Apr. 2001,
> *University of Western Ontario*, Dept. of Computer Science, Apr. 2001.

"Stochastic tracking of humans,"

> *University of Pennsylvania*, GRASP Laboratory, Feb. 2001,
> *New York University*, Center for Neural Science, Feb. 2001,
> *The Robotics Institute*, Carnegie Mellon University, Nov. 2000,
> *Brown University*, Dept. of Applied Mathematics, Sept. 2000.

"Generative spatio-temporal models of optical flow events,"

> *Imaging Science & Biomedical Eng.,* Univ. of Manchester, Oct. 1999,
> *Gatsby Computational Neuroscience Unit,* Univ. College, London, Oct. 1999,
> *Smith-Kettlewell Eye Research Institute,* San Francisco, July 1999,

Brown Univ., Dept. of Computer Science, May 1999,
UCLA, Mathematics Dept., April 1999,
Univ. of Southern California, Dept. of Comp. Sci. April 1999,
California Institute of Technology, Vision Seminar, April 1999,
Univ. of California at Berkeley, Vision Seminar, Feb. 1999,
University of Toronto, Dept. of Computer Science, Feb. 1999,
Interval Research, Palo Alto, CA, Feb. 1999.

"Motion: From estimation to explanation,"

Royal Institute of Technology (KTH), Stockholm, Sweden, Sept. 1998.

"A framework for modeling appearance change in image sequences,"

Royal Institute of Technology (KTH), Stockholm, Sweden, Dec. 1998.

"A probabilistic framework for matching temporal trajectories: Condensation-based recognition of gestures and expressions,"

INRIA Rhônes Alpes, Grenoble, France, May 1998.

"Human motions and computer interfaces,"

McGill University, Center for Intelligent Machines, August 1998,
Univ. of Heidelberg, Interdisciplinary Center for Sci. Comp., June 1998,
Harvard Univ., Division of Engineering and Applied Sciences, May 1998,
Brown Univ., Dept. of Computer Science, March 1998,
Stanford Univ., Dept. of Computer Science, March 1998,
Rutgers Univ., Cognitive Science Colloquium, Dec. 1997.

"Looking @ people: Estimation and explanation of human motion,"

MIT, AI Lab Colloquium, Nov. 1997,
Smith-Kettlewell Eye Research Institute, San Francisco, Oct. 1997,
Univ. of California at Berkeley, AI/Robotics/Vision Seminar, Oct. 1997,
Univ. of Toronto, Artificial Intelligence Colloquium, Oct. 1997.

"Motion explanation: Learning parameterized models of optical flow,"

Univ. of Central Florida, Computer Science Dept. Colloquium, March 1997,
Univ. of South Florida, Computer Science Dept., March 1997.

"Introduction to robust statistics with applications in computer vision,"

CS 348D: Vision and Image Processing, Stanford University, Dec. 1996.

"EigenTracking: Robust matching and tracking of articulated objects using a view-based representation,"

Royal Institute of Technology (KTH), Stockholm, Sweden, Nov. 1998,
Courant Institute, NYU, New York, February 1997,
Interval Research Corporation, Palo Alto, CA, Dec. 1996,
Univ. of British Columbia, Dept. of Computer Science, Vancouver, Aug. 1996,
MIT, Department of Brain and Cognitive Science, Cambridge, MA, May 1996.

"Human gestures and the Digital Office,"

> *Univ. of Maryland*, Computer Vision Laboratory, College Park, MD, Sept. 1996.

"If only your computer could see you now: Tracking and recognizing facial expressions in video,"

> *Univ. of British Columbia*, Dept. of Computer Science, Vancouver, Jan. 1996,
> *Interval Research Corporation*, Palo Alto, CA, Sept. 1995.

"Estimating optical flow in segmented images using variable-order parametric models with local deformations,"

> *Interval Research Corporation*, Palo Alto, CA, Sept. 1994,
> *Univ. of California at Berkeley*, Dept. of EECS, Aug. 1994,
> *Univ. of Maryland*, Computer Vision Laboratory, College Park, MD, July 1994,
> *Univ. of British Columbia*, Comp. Science Colloquium, Vancouver, June 1994.

"Robust estimation of multiple motions,"

> *Stanford University*, Department of Psychology, Nov. 1993,
> *IRISA/INRIA*, Rennes, France, Aug. 1993.

"Robust incremental optical flow,"

> *Xerox PARC*, March 1993,
> *University of Toronto*, Research Group in Perception, Jan. 1993,
> *David Sarnoff Research Center*, Aug. 1992,
> *Teleos Research*, July 1992.

"Robust dynamic motion estimation over time,"

> *Yale University,* Industry Liaison Meeting, Oct. 1990,
> *Yale University,* Vision Lunch, May 1991.

"Motion estimation, Markov random fields, and simulated annealing,"

> *Yale University,* Department of Statistics, Sept. 1990.

"Current research in incremental motion estimation,"

> *Columbia University,* Sept. 1990, (with P. Anandan).

"Incremental motion estimation,"

> *NASA Ames Research Center,* June 1990,
> *Advanced Decision Systems,* Aug. 1990.

"Early detection of motion discontinuities,"

> *Univ. of California, Berkeley*, June 1990,
> *NASA Ames Research Center*, June 1990.

Other Talks   "Towards Scenes with People from Video,"

Scenes from Video (SfV) Workshop, III, Lago di Garda, Italy. Oct. 2017.

"The persistence of structure: Layers, time, and the estimation of motion,"

Scenes from Video (SfV) Workshop. Barossa Valley, Australia. Dec. 2013.

"From Scans to Avatars. Using Multi-Viewpoint, High Precision 3D Surface Imaging to create Realistic Deformable Models of the Body."

Jointly with Chris Lane, CEO 3dMD LLC. *3rd International Conference and Exhibition on 3D Body Scanning Technologies*, Lugano, Switzerland, 16-17 October 2012.

"Computing Optical Flow,"

Computational Vision Summer School 2012, Freudenstadt-Lauterbad (Black Forest), June-July 2012.

"Seeing machines,"

Paul-Peter Ewald Kolloquium, MPI for Intelligent Systems, Stuttgart, July 1, 2011.

"Probabilistic encoding and decoding of motor cortical activity,"

DARPA Bio:Info:Micro PI Meeting, Boston, MA, Oct 31–Nov 1, 2002.

"Connecting brains with computers: The neural control of robotic devices,"

Brown University Mind Brain Retreat, Killington, VT, Mar. 2002.

"The machine inside,"

Voyages of Discovery, Inauguration of Ruth J. Simmons, 18th President of Brown Univ., with E. Bienenstock, D. Sheinberg, and M. Serruya. Providence, RI, Oct. 2001.

"The science of silly walks,"

Brown University Conference on Stochastic and Deterministic Approaches in Vision, Language, and Cognition, Whispering Pines, RI, May 2001.

"Condensation-based gesture recognition,"

3rd San Francisco Bay Area Vision Meeting, Interval Research, April. 1998.

"Motion: Looking back and moving forward,"

2nd San Francisco Bay Area Vision Meeting, Xerox PARC, Dec. 1997.