Juan P Wachs

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EDUCATION	Ben Gurion University of the Negev, Israel Ph.D. in Industrial Engineering and Managemen Advisor: Helman Stern and Yael Edan Optimal Hand Gesture Vocabulary Design Meth Robotic Control	it iodology for Virtual	2003-2008
	Ben Gurion University of the Negev, Israel M.Sc. in Industrial Engineering and Managemer Advisor: Helman Stern and Yael Edan Optimal Hand Gesture Vocabulary Design Meth Robotic Control. Magna Cum Laude	nt Iodology for Virtual	2001-2003
	ORT Academic College at the Hebrew Universit Ed.Tech in Electronics Education Cum Laude	y Campus, Israel	1991-1995
POSITIONS	Program Director, National Science Foundation Co-Chair of Foundational Robotics Research (FR Collaborative Research in Computational Neuro National Artificial Intelligence Research Institute NSF chair of the interagency NITRD Intelligent F Autonomous Systems (IRAS) working group.	(NSF) RR) oscience (CRCNS), s (AI) Robotics and	2022-Now
	Program Director, National Science Foundation National Robotics Initiative (NRI). National Artificial Intelligence Research Institute	(NSF) s (Al)	2021-2022
	School of Industrial Engineering, Purdue Univers Professor, Faculty Scholar	sity, US	2020-Now
	IE-MEDIC LCC, Chief Executive Officer (CEO)		2020-Now
	School of Industrial Engineering, Purdue Univers James A. and Sharon M. Tompkins Rising Star A	sity, US ssociate Professor	2015-2020
	School of Industrial Engineering, Purdue Univers Assistant Professor	sity, US	2009-2015
	Naval Postgraduate School, MOVES Institute, N	lonterey, CA, US	2008-2009

Postdoctoral Researcher

Inst. of Agricultural Engineering - Volcani Center, Israel Ben Gurion University of the Negev, Israel Postdoctoral Researcher	2007-2008
Washington Hospital Center, Washington, DC Institute for Medical Informatics, IMI Informatics Fellow	2004-2005

AWARDS AND HONORS

Best Paper Award HFES 2021	2021
Distinguished Interdisciplinary Research Award RO-MAN 2021	2021
University Faculty Scholar	2020
Faculty Inventor	2020
Outstanding Paper Award AE-CAI Workshop as part of MICCAI	2020
Best Paper Award HFES 2020	2020
Distinguished Speaker of the ACM	2018-2021
James A. and Sharon M. Tompkins Rising Star Professorship	2018
Best Paper Award IMAWM 2018	2018
Best Paper Award IRIACV 2017	2017
Fulbright U.S. Scholar	2016
2015 Helmsley Senior Scientist Fellow	2015
Best Poster Presentation Award AAAI 2015 (2 min present.)	2015
IEEE Appreciation Award	2013
2013 AFOSR Young Investigator Program	2013
2012 Air Force Summer Faculty Fellowship Program (SFFP)	2012
Finalist Best Paper Award IEEE SMC 2011	2011
National Research Council (NRC) Associateship Program Award	2008

PUBLICATIONS Journal Articles

- [1] Madapana, N., & Wachs, J. P. (2022). JSSE: Joint Sequential Semantic Encoder for Zero-Shot Event Recognition. IEEE Transactions on Artificial Intelligence.
- [2] Yang, J., Barragan, J. A., Farrow, J. M., Sundaram, C. P., Wachs, J. P., & Yu, D. (2022). An Adaptive Human-Robotic Interaction Architecture for Augmenting Surgery Performance Using Real-Time Workload Sensing—Demonstration of a Semi-autonomous Suction Tool. Human Factors, 00187208221129940.
- [3] Chen J, Dobron A, Esterson A, Fuchs L, Glassberg E, Hoppenstein D, Kalandarev-Wilson R, Netzer I, Nissan M, Shifer Ovsiovich R, Strugo R, Wacht O, Ball CG, Garraway N, Gillman L, Kirkpatrick AW, Kock V, McBeth P, McKee J, Wachs J, d'Amours SK. A randomized, controlled, blinded evaluation of augmenting point-of-care ultrasound and remote telementored ultrasound in inexperienced operators. Isr Med Assoc J. 2022 Sep;24(9):596-601. PMID: 36168179

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- [5] Madapana, N.; Chanci, D.; Gonzalez, G.; Zhang, L.; and Wachs, J., P. (2022). Touchless Interfaces in the Operating Room: A Study in Gesture Preferences. International Journal of Human–Computer Interaction,1-11. 4.
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- [7] Barragan, J., A.; Yang, J.; Yu, D.; and Wachs, J., P. (2022). A neurotechnological aid for semi-autonomous suction in robotic-assisted surgery. Scientific Reports, 12(1): 4504. 12 2022.
- [8] Xiao, C.; Wachs, JP (2022). Nonmyopic Informative Path Planning Based on Global Kriging Variance Minimization. IEEE Robotics and Automation Letters. Forthcoming.
- [9] C. Xiao, S. Xu, W. Wu, J. Wachs. (2022). Active Multi-Object Exploration and Recognition via Tactile Whiskers. IEEE Transactions on Robotics. Forthcoming.
- [10] Kirkpatrick, A., McKee, J., Tomilson, C., Wachs, J.P., Donley, N. (2021) Watch Before or Listen While Doing? A Randomized Pilot of Video-Modelling versus Telementored Tube Thoracostomy. Prehospital and Disaster Medicine. 37(1), 71-77.
- [11] Rojas, E.; Wachs, JP. (2021). Assessing Task Understanding in Remote Ultrasound Diagnosis via Gesture Analysis. Pattern Analysis and Applications. 24(4), 1489-1500.
- [12] Li, JY, Dong H; Kolsch, M; Wachs, P.; Bouman, C. Fast and Robust UAV to UAV Detection and Tracking from Video (2021). IEEE Transactions on Emerging Topics in Computing. Forthcoming.
- [13] Madapana, N; Wachs, JP. (2021) JSE: Joint Semantic Encoder for Zero-Shot Gesture Learning. Pattern Analysis and Applications. (2021): 1-14.
- [14] Xiao, C.; Madapana, N; Wachs, JP (2021). Fingers See Things Differently (FIST-D): An Object Aware Visualization and Manipulation Framework Based on Tactile Observations. IEEE Robotics and Automation Letters. 6(3), 4249-4256.
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Conference Proceedings

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- [3] Barragan, J., Yu, D., Wachs, JP. (2022). Semi-Autonomous blood suction robotic assistant for remote surgical procedures. Military Health System Research Symposium (MHSRS), 12-15 September, Kissimmee, FL.
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- [5] Ocegueda Barraza, A.; Morgan, E., Duerstock, B., Wachs. J. (2022). Development of an Intelligent Soft Orthotic Device (ISOD) for Adaptive Hand Rehabilitation. Military Health System Research Symposium (MHSRS), 12-15 September, Kissimmee, FL.
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- [108] H. Stern*, J. P. Wachs, Y. Edan (2004). Parameter Calibration for Reconfiguration of a Hand Gesture Tele-Robotic Control System. In Proc. Of the U.S.A.-Japan Symp. on Flexible Automation, Denver, Colorado.
- [109] J. P. Wachs*, H. Stern, Y. Edan (2003). Parameter search for an image processing fuzzy C-means hand gesture recognition system. In Proc. of IEEE Intl Conf. on Image Processing ICIP 2003, Spain, Vol. 3, pp. 341.
- [110] J. P. Wachs*, U. Kartoun, Y. Edan, H. Stern*. (2002). Real-Time Hand Gesture Telerobotic System Using the Fuzzy C-Means Clustering Algorithm. In IE&M, Proc. 2th annual Conf of Industrial Eng and Management, Tel-Aviv, Israel, pp. 94-98. Received Student Paper Award.
- [111] J. P. Wachs*, U. Kartoun, Y. Edan, H. Stern. (2002). Real-Time Hand Gesture Telerobotic System Using the Fuzzy C-Means Clustering Algorithm. In Proc. of the World Automation Congress, WAC 2002, Orlando, FL, USA, vol. 13, pp. 403 – 409

Books and chapters in books

- Zhou, T, M E. Cabrera, and J P. Wachs*. (2016) "A Comparative Study for Touchless Telerobotic Surgery." Computer-Assisted Musculoskeletal Surgery. Springer International Publishing, 2016. 235-255.
- [2] J. P. Wachs. Designing Embodied and Virtual Agents for the Operating Room: Taking a Closer Look at Multimodal Medical Service Robots and Other Cyber-Physical Systems. Speech and Automata in Healthcare Voice-Controlled Medical

and Surgical Robots Series: Speech Technology and Text Mining in Medicine and Healthcare. A. Neustein (Ed). De Gruyter, 2014; November 2014; ISBN: 978-1-61451-515-9.

- [3] Kölsch, M., Wachs, J. P., & Sadagic, A. (2013). Visual Analysis and Filtering to Augment Cognition. In Foundations of Augmented Cognition. Springer Berlin Heidelberg. pp. 695-702.
- [4] J. P. Wachs, H. Stern, T. Burks and V. Alchanatis. (2009). Multi-modal Registration Using a Combined Similarity Measure. Applications of Soft Computing: Updating the State of the Art Series: Advances in Intelligent and Soft Computing, Avineri, E.; Köppen, M.; Dahal, K.; Sunitiyoso, Y.; Roy, R. (Eds.), Springer, Vol. 52, pp.159-168.
- [5] J. P. Wachs, H. Stern, Y. Edan, M. Gillam, C. Feied, M. Smith, J. Handler (2007). Gestix: A Doctor-Computer Sterile Gesture Interface for Dynamic Environments. Soft Computing in Industrial Applications. Recent and Emerging Methods and Techniques Series: Advances in Soft Computing, Vol. 39 Saad, A.; Avineri, E.; Dahal, K.; Sarfraz, M.; Roy, R. (Eds), pp. 30-39.
- [6] J. P. Wachs, H. Stern, Y. Edan, M. Gillam, C. Feied, M. Smith, J. Handler. (2006). A Real-Time Hand Gesture Interface for Medical Visualization Applications. Applications of Soft Computing: Recent Trends. Springer Verlag, Germany, Series: Advances in Soft Computing, Tiwari, A.; Knowles, J.; Avineri, E.; Dahal, K.; Roy, R. (Eds.), vol. 36, pp. 153-163.
- [7] J. P. Wachs, O. Shapira, and H. Stern (2005) A Method to Enhance the 'Possibilistic C-Means with Repulsion' Algorithm based on Cluster Validity Index. Applied Soft Computing Technologies: The Challenge of Complexity, Springer Verlag, Germany, Series: Advances in Soft Computing, Abraham, A.; Baets, B.D.; Köppen, M.; Nickolay, B. (Eds.), vol. 34, pp. 77-90.

Manuscript under Review

- J. P. Wachs. (2019). "Gestation: Gesture Emergence in the Technological World". Cambridge Press. (proposal in review).
- [2] G. Gonzalez, M. M. Rahman, M. Agarwal, V. Aggarwal, R. M. Voyles, Y. Xue, and J. Wachs. (2022). ASAP: A Semi-Autonomous Precise System for Telesurgery during Communication Delays". IEEE Transactions on Medical Robotics and Bionics (Major Revisions)
- [3] M. J. Jacobson, D. C. Arrubla, M. R. Tricas, M. E. Masry, S. Gnyawali, G. Gordillo, Y. Xue, C. Sen, J. Wachs, Autonomous Multi-modality Burn Wound Characterization using Artificial Intelligence. Warfighters 2022 (submitted)
- [4] Kirkpatrick, A., W.; McKee, I., A.; Knudsen, B.; Shelton, R.; LaPorta, A., J.; Wachs, J.; and McKee, J., L. Human Cognitive Architecture and Extreme Prehospital Interventions. The Canadian Journal of Surgery
- [5] C. Xiao, A. Woeppel, G Clepper, S Gao, S Xu, J Rueschen, D Kruse, W. Wu, H Tan, T Low, S Beaudoin, B Boudouris, W Haris, J Wachs. "Sensing, Haptic Rendering, and Assistant Approach for a Telepresence Explosive Ordnance Disposal Robot", IEEE Transactions on Robotics (under review)

GRANTS AND FELLOWSHIPS

2021-2023	USAMRAA: \$1.9M AutoMated BUrn Diagnostic System For Healthcare (AMBUSH) PI: Gordillo, co-PI: Wachs
2021-2023	USAMRAA: \$1.98M Connected and Autonomous Procedure Support Tools for Combat Trauma and Mass Casualty Management PI: Colombo, co-PI: Wachs
2022-2027	Surgical Intuitive; \$300,000 Beyond high vs. low assessment of workload and team skills: Continuous sensing enables prediction of incremental changes in cognitive and team skills PI: Yu; co-PI: Wachs
2021-2023	NIH R21; \$211,852 FIrst REsponse BUrn Diagnostic System (FIRE-BUDS) PI: Juan P. Wachs (acting Xue due to NSF position)
2020-2021	NSF: \$50,000 NSF: I-Corps: An offline surgical telementoring platform that guides the surgeon via an augmented reality headset PI: Wachs
2019-2021	NSF ; \$1,499,795 NSF / NRI: NRI: INT: FIngers See Things Differently (FIST-D): A Robotic Explosive Ordnance Disposal (EOD) based on Augmented Tactile Imaging PI: Wachs
2019-2021	Ford Motor Company: \$200,000 Multimodal Cognitive and Perception Sensing For Situational Awareness PI: Deny Yu
2019-2020	TRASK; \$50,000 Portable and Real-time Image Perception System for the Blind PI: Duerstock
2019-2021	NIH; \$221,595 Real-time non-intrusive workload monitoring-Integration of human factors in surgery training and assessment PI: Denny-Yu
2019-2021	NSF; \$250,000 PFI-TT: A portable and real-time system for individuals with visual impairments to explore digital images using alternate feedback

	PI: Wachs
2019-2023	NSF; \$406,814 FMitF: Collaborative Research: Track I: Embedding Constraint Reasoning in Machine Learning for Better Prediction and Decision- making PI: Xue
2018-2019	Surgical Intuitive; \$50,000 Transforming training and augmenting performance with real-time cognitive workload sensing PI: Wachs
2018-2020	USAMRAA; \$1,280,000 Fundamental Theory for Dexterous Surgical Skills Transfer to Medical Robots. PI: Wachs
2018	Surgical Intuitive: Gift in Kind In Kind- Full Da-Vinci Surgical System (used) ~ assessed at \$250,000 PI: Wachs
2017-2018	Walther Embedding Program; \$40,000 PI: Yu
2017-2019	USAMRAA: \$1,000,000 See-what-I-do: Increasing Mentor and Trainee Sense of co- presence in Trauma Surgeries with the STAR Platform" (Phase II) PI: Wachs
2016-2018	CTSI; \$158,989 Adaptive VR-based gesture recognition system for improved rehabilitation of quadriplegics due to spinal cord injury PI: Duerstock
2017-2018	Surgical Intuitive; \$50,000 A non-intrusive tool to measure cognitive workload during surgery PI: Yu
2016-2019	AHRQ; \$748,015 GestureClean: A Touchless Interaction Language for the Operating Room PI: Wachs
2016-2017	ONR/NPS; \$100,000 A Proposal for Collaborative Research in Multi-Target Sense and Avoid for Small, Lightweight Unmanned Aerial Vehicles (UAVs) PI: Wachs
2016 - 2017	OVPR Equipment Grant: \$66,000

	Making Brain Science Studies accessible to all with the Nautilus system g.Nautilus 32, g.LADYbird – 32 PI: Wachs
2015 - 2016	ONR/NPS; \$90,000 An efficient real-time method for detection and characterization of UAVs PI: Wachs
2015 - 2016	OVPR; \$14,172 Transdisciplinary and Interdisciplinary Research Grant - The Algorithmic Gardener – Tales of Nature and Code: Creating New Metaphors for Future Natures through Critical Gardening PI: Winkler
2014-2020	NSF; \$325,000 Collaborative Research: I/UCRC for Robots and Sensors for the Human Well-being PI: Matson
2014-2017	NSF; \$1,200,000 MRI Development: Human Avatars - "Enabling Research in Natural Communication with Virtual Tutors, Therapists, and Robotic Companions PI: Mahoor
2014-2017	USAMRAA/ TATRC: \$750,000 See-what-I-do: Increasing Mentor and Trainee Sense of co- presence in Trauma Surgeries with the STAR Platform PI: Wachs
2013 - 2016	Qatar National Research Foundation: \$1,050,000 Robotic Assistants in Operating Rooms in Qatar "Theory, Development and Integration" PI: Wachs
2013 - 2016	2013 AFOSR Young Investigator Research Program: \$358,857 Embodied Interactions in Human-Machine Decision Making for Situation Awareness Enhancement Systems PI: Wachs
2012 - 2013	OVPR Laboratory Equipment Program: \$100,000 A Dual Robotic Arm to Enhance Cross-disciplinary Capabilities and Exploration PI: Wachs
2012 - 2013	Indiana Clinical and Translational Sciences Institute (CTSI): \$75,000 Gestonurse: A Robotic Scrub Nurse That Understands Hand Gestures PI: Wachs
2012 - 2012	Endologix: \$14,265

	Challenges of Selective Catheterization across the Aortic Bifurcation with Different Endografts PI: Wachs
2010 - 2012	AHRQ (Agency for Healthcare Research and Quality) R03 : \$100,000 HS019837-01- Context-Based Hand-Gesture Recognition for the Operating Room PI: Wachs
2010 - 2011	Discovery Park Seed Grant: \$18,397 Collaborative Assistive Robotics PI: Wachs
2010 - 2011	Purdue Research Foundation: \$16,795 Distributed Sensor Fusion Methodology In Intelligent Rooms PI: Wachs
2009 - 2011	Indiana Clinical and Translational Sciences Institute (CTSI): \$9,685 A Window on Tissue - Tissue Depth Visualization using Face Orientation for Laparoscope Control PI: Wachs
Member of Member of Member of Member of Chair of th Healthcard Chair of th Faculty Se Industrial	of the IE Chair Search Committee Spring 2021. of the Search Committee, 08/16/2020. of the Undergraduate Committee, 08/16/2020. of the PEI Faculty Council in Biomedical Engineering Fall, 2019 ne Undergraduate Committee, 01/07/2019. e Engineering Signature Area Committee, 2009-2019. ne Safety Committee, 2013, 2016, 2018. earch Committee, 2012-2014 Engineering Graduate Recruiting Committee, 2009-2011
Program I C Sy C R C C N Program I N Program I R R F R F F F F F F F F F F F F F	Director at NSF. CISE / Robust Intelligence (2022-now) hair of the interagency NITRD Intelligent Robotics and Autonomous ystems (IRAS) working group o-Chair of the Foundational Research in Robotics (Robotics) Program obust Intelligence (RI) Program ollaborative Research in Computational Neuroscience (CRCNS) ational Artificial Intelligence Research Institutes Director at NSF. CISE / Robust Intelligence (2021-2022) ational Robotics Initiative 3.0 (NRI-3.0), oundational Research in Robotics (Robotics) Program obust Intelligence (RI) Program airness in Artificial Intelligence (FAI) Program
	2010 - 2012 2010 - 2011 2010 - 2011 2009 - 2011 2009 - 2011 Member of Member of Member of Member of Chair of th Healthcard Chair of th Healthcard Chair of th Faculty Se Industrial Program I • Cl Sy • Co • Ro • Ro • Ro • Ro • Ro • Ro • Ro

INVITED TALKS & "Disasters and Wartime Influences in Cyber-Healthcare." **Keynote** at The PRESENTATIONS IEEE/ACM international conference on Connected Health: Applications, Systems and Engineering Technologies (CHASE) CHASE '22, Nov 21, 2022.

> "Bridging Fingers Gestures for Knowledge Gain." **Keynote** HBU 2022. 12th International Workshop on Human Behavior Understanding (HBU) Held in conjunction with ICPR 2022, Apr 22, 2022.

"Can Machines Learn with No Data? One Step Towards Human-Like Learning", University of Florida, Nov. 11, 2022.

"Immersive Robotics and the Curse of Sterility." Talk at the University of Winchester, UK, Apr. 29, 2022.

"GestureClean: A Touchless Interaction Language for the Operating Room". Talk at the Agency for Helthcare and Research, Jan 31, 2022.

Singularity Observational Learning (SOL). Invited Talk. I2O. DARPA

"Immersive Robotics and the Curse of Sterility." Talk at the University of Virginia, joint seminar, Mechanical Engineering and Electrical and Computer Engineering, Oct. 17, 2021.

"Immersive Robotics and the Curse of Sterility." Talk at National Science Foundation, CISE, Intelligent Information System Division., Jan 15, 2021.

"Surgery, Robots and AI", Brief at ATT (virtual presentation). Nov. 5, 2020.

"The Cyber Touch: Empowering Medical Robots Through Gestures." Talk at the University of Colorado, Denver. May 11, 2020 (virtual).

"POWER: Physiological and Objective Workload Estimation in Real-time". Presentation at the DVRK meeting at Surgical Intuitive: Jun 30, 2020.

"Robot, pass me the scalpel! New Challenges for Surgical Robots" (virtual). Presentation at the 5G-JBSA National Spectrum Consortium Oct. 1, 2020.

Keynote "Challenges of Computer Vision in Medical Robotics", Jul 9, 2020 at "SARAS endoscopic vision challenge for surgeon action detection (SARAS-ESAD 2020)".

"Robot, pass me the scalpel! New Challenges for Surgical Robots" Talk at Purdue Series "Rising to the Challenge" : The Future of Robotics & Healthcare. Sept. 29, 2020 (virtual).

"Fingers See Things Differently (FIST-D): A Robotic Explosive Ordnance Disposal (EOD) based on Augmented Tactile Imaging" National Robotics Intuitive Meeting:. Feb 26, 2020.

"The Cyber Touch: Empowering Medical Robots Through Gestures". LCRS Seminar, Johns Hopkins University, (Nov. 13, 2019).

"Towards Learning from Nothing: Paving the way for Ever Learning Machines". Technion, Haifa, Israel, (Oct. 8, 2019).

'Robots without Borders: "A Brave New World in Healthcare Robotics"'. Rambam Healthcare Campus department of Obstetrics and Gynecology in Haifa, Israel, (Oct. 10, 2019).

"Cybernetic Solutions to Remote Trauma Care". Hamlyn Symposium. British Geographic Society, London, UK, 2019 (June 25).

"Paving the way for Ever Learning Machines". Computer Vision Conference, Las Vegas, Key-note. (April 26).

"Telementoring using the STAR system – Teleporting Surgical Expertise". The Future VR/AR Network – Towards Virtual Human/Object Teleportation – NSF Vision Workshop on Networked Virtual and Augmented Reality Communications Workshop, Arlington, Virginia, (April 23, 2018).

"Workload Assessment in Robot Assisted Surgery". 2018 Intuitive Surgical Research Symposium, Sunnyvale, CA (January 19, 2018).

"See-What-I-Do: Increasing mentor and trainee sense of co-presence in trauma surgeries with the STAR platform." JPC-1. Medical Simulation Program Review. Department of Defense. TATRC. (Feb 7, 2018).

"Learning from Nothing: What One Shot Can Tell Us About Zero Shot Learning?". AFOSR Young Investigators Meeting. Washington DC, (Nov. 14, 2017).

"Wisdom in our fingers." TEDx, (April 6, 2016).

'Gist of a Gest: Can Machines Recognize "Almost" Spontaneous Gestures?', Universidad de Buenos Aires, Argentina, (Sept. 14, 2016).

"El poder de los gestos: interactuando con robots para el bienestar". Primer Congreso de Robotica. Universidad del Salvador, Buenos Aires, (Nov. 1, 2016).

"El poder de los gestos: interactuando con robots para el bienestar". Instituto Tecnologico de Buenos Aires, Buenos Aires, (Nov. 1, 2016).

"El poder de los gestos: interactuando con robots para el bienestar." INTI -Instituto Nacional de Tecnología Industrial (INTI), Buenos Aires, (Nov. 23, 2016).

"El CYBERTOUCH: Humanos y Maquinas Colaborando en el Quirofano", Instituto Tecnologico de Buenos Aires (ITBA), Buenos Aires, (Nov. 23, 2016).

"See-What-I-Do: Increasing mentor and trainee sense of co-presence in trauma surgeries with the STAR platform". US Army Medical Research and Materiel Command (USAMRMC), Joint Program Committee (JPC-1). Fort Detrick, Maryland. (August, 10, 2015).

"Embodied Interaction in Healthcare New Opportunities for Old Challenges". Universidad de los Andes, Bogota, Colombia, (August, 6, 2015). "Embodied Interaction in Healthcare New Opportunities for Old Challenges". Universidad de Antoquia, Medellin, Colombia, (August, 3, 2015).

"IE for the Benefit of Society: A Non Traditional Take on Assistive Technologies". Universidad del Norte, Barranquilla, Colombia, (July, 31, 2015).

"Embodied Interaction in Healthcare New Opportunities for Old Challenges". Ben-Gurion University of the Negev, ABC Robotics Seminar, (June, 29, 2015).

"Augmenting Physical Action with Gaming Technologies: A Brave New World in Healthcare". Il Congreso Internacional Industria y Organizaciones. Universidad Nacional de Colombia. Bogota, Colombia. (August, 5, 2015).

"Hand Gesture Interaction for Healthcare - A New Challenge". IU School of Informatics and Computing. SOIC Colloquia. (February 7, 2014).

"Gestures in the Operating Room- Can Save Lives." Body Tracking in Healthcare. Microsoft Research Symposium, UK, (Nov.14, 2013).

"Don't Give Knives to Robots: an Old-New Era in Surgical Robotics". 5th Annual Computational Science and Engineering Student Conference 2013. Keynote speaker. (April 5, 2013)

"Should robots work with us in the Operating Room?" IEEE Southeastern Michigan Spring Section Conference. Robotics and Automation Society. Dearborn, Michigan. (April 10, 2012)

"Robot, pass me the scissors! How robots can assist us in the Operating Room". 17th Iberoamerican Conference on Pattern Recognition, CIARP 2012, Buenos Aires, Argentina. Keynote Speaker. (Sept 3, 2012)

"Gestonurse: A Robotic Surgical Assistant. Invited Technical Sketch." The 7th ACM/IEEE International Conference on Human Robot Interaction (HRI 2012), Boston, Massachusetts. (March 5, 2012)

"Robot, pass me the scissors! How robots can assist us in the Operating Room". ITBA (Instituto Tecnológico de Buenos Aires), Buenos Aires, Argentina, (Sept 7, 2012).

"Robotics, Collaboration and Human-Robot Interfaces". Systems Group Talk, Technion, Israel. (Jan 3, 2012)

"Surgical robotics and human robot interaction". The William Davidson Faculty of Industrial Engineering and Management. Bi-weekly Faculty Workshop., Technion, Israel. (Jan 1, 2012)

"Surgical robotics and human-robot interaction." Intelligent Systems Weekly Seminar, Ben-Gurion University, Israel. (Dec. 26, 2011)

"Robotics, Gesture Language and Health". Argentinean Scientific Society, Buenos Aires, Argentina. (Sept 3, 2010).

"Health and Vision". Universidad de Buenos Aires (UBA). Computer Vision Seminar, (Sept. 3, 2010).

"Optimal Hand Gesture Vocabulary Design". NASA Ames, Mountain View, (Feb. 25, 2009).

"Optimal Hand Gesture Vocabulary Design". EE and CS Department Seminar, North Carolina State University, (May 6, 2008).

"Optimal Hand Gesture Vocabulary Design." Computer Science Department Seminar, Naval Postgraduate School, Monterey, CA, (Feb 21, 2008).

PROFESSIONAL MEMBERSHIPS	Senior Member of the Institute of Electrical and Electronics Engineers (IEEE)		
	IEEE Signal Processing Society	Since 2003	
	IEEE Systems, Man, and Cybernetics Society	Since 2009	
	Association for Computing Machinery (ACM)	Since 2009	
	Israeli Association of Operation Research (ORSIS)	2004-2008	
PROFFESIONAL SERVICE	Associate Editor of IEEE Transactions of Human Machine Systems (IEEE THMS)	Since 2013	
	Associate Editor of Frontiers in Artificial Intelligence and Robotics	Since 2016	
	Associate Editor of IEEE Intl Conference of Robotics and Automation	2019	
	Associate Editor of IEEE Intl Conference of Robotics and Automation	2018	
	Associate Editor of IEEE Intl Conference of Robotics and Automation	2017	
	Guest Editor of Human-Computer Interaction journal, Special Issue on Body Sensing and Tracking in Healthcare	2014	
	Associate Editor of the Journal of Real-Time Image Processing	2013-2016	
	Guest Editor, Journal of Real-Time Image Processing, Special Issue	2013	
	Guest Editor of Pattern Recognition Letters, Special Issue on Robust Recognition Methods for Multimodal Interaction	2013	
ORGANIZATION	General Chair of IEEE FG 2020 in Buenos Aires, Argentina	2020	
AND	AAAI Program Committee	2020	
COMMITTEES	Organizer Special Session for IEEE FG 2019: Fundamental	2019	
	Challenges in Modeling, Representation and Synthesis of Gestures"		
	Organizer Special Session for IEEE FG 2018. Perception, Cognition and Psychophysiology of Gesture Interaction	2018	
	Organizer and Chair of ASL4GUP International Workshop in	2017	
	Conjunction with the IEEE Face and Gesture Recognition		
	Program Committee ICCV 2017	2017	
	Program Technical Committee AMBIENT	2016	
	Program Committee European Conference on Ambient Intelligence	2014	
	Program Committee, The 3rd International Conference on Robot	2014	
	Program Committee, 2013 SPIE Real-Time Image and Video Processing Conference.	2013	

	Program Comr Behavior Unde	nittee, Third International Workshop on Human rstanding, 2012 IEEE/RSJ International Conference on	2012
	Intelligent Rob	ots and Systems (IROS 2012).	
	Program Comr	nittee, 17th Iberoamerican Conference on Pattern	2012
	Recognition, C	IARP 2012, Buenos Aires, Argentina, Sept 3-6, 2012.	
	Program Comr	nittee of the IEEE 3rd International Workshop on	2012
	Human Behavi	or Understanding (HBU 2012) as part of IROS 2012.	
	International T	echnical Program Committee, 12th online World	2008
	Conference on	Soft Computing in Industrial Applications	2000
	Session Chair F	20.MAN 2019 "Imitation Learning"	2019
	Session Chair F	COMAN 2017 Initiation Learning	2017
	Cognition"	CO-MAIN 2017 Situation Awareness and Spatial	2017
	Cognition Special Service	Chair EG 2010 Eurodomontal Challongoo in	2010
	Special Session	recentertion and Conthesis of Costume"	2019
		Cluster Contraction and Synthesis of Gestures	204.0
	Special Session	Chair FG 2018 Perception, Cognition and	2018
	Psychophysiolo	bgy of Gesture Interaction "	
	Session Chair I	EEE SMC 2011 Conference, "Gesture-Based	2011
	Interaction and	Semiotics"	
	Reviewer Scier	ice Robotics, AAAI, Neural Networks, IEEE AI.	2020
	Reviewer NSF	Future of Work – HTF	2020
	Reviewer NSF	Center Site Visit (STC).	2020
	Reviewer, NSF	Partnerships for Innovation (PFI)	2020
	Reviewer NSF	PFI	2019
	Reviewer Show	valter Trust	2018
	Reviewer NSF	NRI	2018
	Reviewer Unite	d States Israel Binational Science Foundation	2018
	Reviewer NSF	NRI	2017
	Reviewer BAR)	2013
	Reviewer NSF	IGERT	2010
	Reviewer NSF	RAPD	2010
GRADUATE	Current		
ADVISEE	Students:		
	PhD Students	Yupeng Zhuo, TBD	2022-
			Current
		Xinwei Zhang, TBD	2022-
		Xinwer Zhung, 100	Current
		Ning ligna TPD	2021
			2021-
			Current
		Chenxi Alao, Haptic and Wultisensor Explosive	2017- Current
		Exploration	Current
		Glebys Gonzalez, "I ranster learning for multiple robot	2015 -
		coaching"	Current
	Master	Alfredo Ocegueda Barraza	2019-
	Students		Current

		Development of a Soft Hand Exoskeleton for Hand Rehabilitation		
	PhD Students Alumni	Naveen Madapana, "Zero shot machine learning methods for Gesture Recognition" (Amazon) Akash Agarwal, "Security and reliability of Internet of Things (IoT)" (Amazon) Edgar Rojas, "A metric for gesture comparison which is medium, time, and space invariant" (Texas A&M) Maria Eugenia Cabrera, "Gist of a Gest: Learning Gestures for the First Time". U Mass Lowell Hairong Jiang, Effective and interactive interpretation of gestures by individuals with mobility impairments Nvidia Jing Li, Texas Instrument, CA Fast and Robust UAV to UAV Detection and Tracking Algorithm Mithun Jacob, Google X, CA Optimal modality selection for multimodal human- machine systems using RIMAG Yu-Ting Li, Intel, CA An attentional based approach for rendering optimal feedback in gestural interaction	2017 - 2022 2016 - 2022 2017- 2021 2015- 2019 2013- 2018 2015- 2019 2010- 2015 2010- 2015	
	Master Students Alumni	Daniela Chanci Arrubla, "Autonomous System for Detection and Treatment of Burn Injuries" Natalia Sanchez Tamayo, "Robot-human skill transfer in the surgical domain" Naveen Madapana, "Zero shot machine learning methods for Gesture Recognition" Juan Antonio Barragan, "Semi-Autonomous Assistant for the Da-Vinci Surgical Robot"	2018 - 2021 2017- 2020 2017 - 2019 2019 - 2021	
	Postdoctoral Researcher Alumni	Dong Hye Ye, Marquette University Carlos Velasquez, Hamad Medical Center	2013- 2015 2014-	
TEACHING	2021 2021 2020 2020 2019 2019	SpringIE 690Gestures & Bodial Interaction SystemSpringIE 474Industrial Control SystemsSpringIE 574Industrial Robotics & Flexible AsserSpringIE 590Deep Learning in Machine VisionSpringIE 474Industrial Control SystemsSpringIE 690Gestures & Bodial Interaction System	2018 ems nbly ems	

2018	Fall	IE 590	Machine Vision and Robotics
2018	Spring	IE 474	Industrial Control Systems
2018	Spring	IE 574	Industrial Robotics & Flexible Assembly
2017	Fall	IE 590	Machine Vision and Robotics
2017	Spring	IE 575	Industrial Robotics & Flexible Assembly
2016	Fall	590-UB	Vision por Maquina: Aplicaciones en Robotica
2016	Spring	IE 474	Industrial Control Systems
2016	Spring	IE 574	Industrial Robotics & Flexible Assembly
2015	Fall	IE 474	Industrial Control Systems
2015	Spring	IE 474	Industrial Control Systems
2015	Spring	IE 690	Gestures & Bodial Interaction Systems
2014	Fall	IE 590	Machine Vision and Robotics
2014	Spring	IE 332	Computing in Industrial Engineering
2013	Fall	IE 474	Industrial Control Systems
2013	Fall	IE 590	Machine Vision and Robotics
2013	Spring	IE 690	Gestures & Bodial Interaction Systems
2013	Spring	IE 474	Industrial Control Systems
2012	Fall	IE 474	Industrial Control Systems
2012	Fall	IE 332	Computing in Industrial Engineering
2012	Spring	IE 590	Advanced robotics and machine vision
2011	Fall	IE 474	Industrial Control Systems
2010	Fall	IE 590	Machine Vision and Robotics
2010	Spring	IE 486	Work Analysis and Design II
2009	Fall	IE 486	Work Analysis and Design II

PRESS Purdue Team Taps Into Augmented Reality For Medical Tech. Inside Indiana Business with Gerry Dick. TV Show. October 4, 2018.

http://www.insideindianabusiness.com/story/39233089/purdue-team-taps-intoaugmented-reality-for-medical-tech

"Robots en el quirófano: el argentino pionero de la cirugía a distancia". La Nacion (most important newspaper in Argentina). Sept. 3, 2016. <u>http://www.lanacion.com.ar/1934194-robots-en-el-quirofano-el-argentino-pionero-de-la-cirugia-a-distancia</u>

Interview in the Radio Show "Qué noche Teté" Hosted by Tete Coustarot. 2016. <u>https://radiocut.fm/audiocut/juan-wachs-con-tete</u>

"Purdue researchers working on new technology to save lives on battlefield" TV. 2015 "Surgical Technology Aims to Mimic 'Teleporting'". NPR. Inside Indiana Business, 2015. CBN News, Rise of the Machines: Robots Man's Best Friend?

http://www.cbn.com/cbnnews/us/2014/June/Rise-of-the-Machines-Robots-Mans-Best-Friend/

"Surgeons could use his hand-gesture system to control robots," Profile. Spectrum Magazine, 19 Aug 2013. <u>http://spectrum.ieee.org/geek-life/profiles/profile-juan-wachs</u> "Robots and people can all get along," NPR Marketplace, Radio broadcast, and online (March 30, 2012):

http://www.marketplace.org/topics/tech/robots-ate-my-job/robots-and-people-can-all-get-along

"Robotic Nurse in Development at Purdue," FOX NEWS, March 18, 2011.