CURRICULUM VITAE
William Joseph Beksi

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Citizenship: U.S.A
Security Clearance: Secret

Department of Computer Science and Engineering
The University of Texas at Arlington
500 UTA Blvd, ERB 523
Arlington, TX 76019

Academic Rank

Assistant Professor of Computer Science and Engineering
Director of the Robotic Vision Laboratory
The University of Texas at Arlington

Education

- **University of Minnesota, Twin Cities**, Minneapolis, MN
  Ph.D., Computer Science, 2018
  M.S., Computer Science, 2016
  Minor in Mathematics
  Advisor: Nikolaos Papanikolopoulos
- **National Taiwan Normal University**, Taipei, Taiwan
  Chinese Language and Cultural Studies, Mandarin Training Center, 2003
- **Stevens Institute of Technology**, Hoboken, NJ
  B.S., Mathematics and Computer Science, 2002

Academic Employment

- Assistant Professor. Department of Computer Science and Engineering,
  University of Texas at Arlington (September 2018 -)
- Research Assistant. Center for Distributed Robotics,
  University of Minnesota (January 2012 - September 2018)

Department of Defense Employment

- ONR Summer Faculty Fellow. Naval Surface Warfare Center Dahlgren Division,
  High Energy Laser Weapon Systems Branch (E10),
  Dahlgren, VA (June 2023 - August 2023)
- ONR Summer Faculty Fellow. Naval Surface Warfare Center Dahlgren Division,
  Autonomous Weapons and Robotics Systems Branch (H63),
  Dahlgren, VA (June 2022 - August 2022)

Industry Employment

- Robotics Engineer. iRobot, Technology Organization,
  Bedford, MA (Summer 2017)
- Software Engineer. Index Engines,
  Holmdel, NJ (2006 - 2010)
- Research and Development Engineer. Setabox Technology,
  Taipei, Taiwan (2003 - 2006)

Membership in Professional Organizations

- The Institute for Electrical and Electronics Engineers (IEEE), Member.

Honors and Awards

Office of Naval Research

- ONR Summer Faculty Fellow (2022, 2023)

National Science Foundation

- NSF CRII Award (2020)

University of Minnesota

- UMII MnDRIVE Ph.D. Fellowship (2018)

Contributions to Research

Funding

Total funding as PI: $2,119,703. UTA's share: $1,033,944.

External Research Grants (Current)

1. An Adaptable, Cost-Effective, Real-Time 3D Vision System for Advanced Manufacturing
   U.S. Air Force, Phase II STTR
   Advanced Manufacturing and Sustainment Technologies and Processes (AF21A-TCSO2)
   PI: William J. Beksi. SBC: krtkl (Ryan Cousins)
   Amount: $1,248,726 (UTA portion: $450,000). Period: September 2023 - August 2025
2. Developing Intelligent Tools for High-throughput Crop Phenotyping
   U.S. Department of Agriculture
   PI: William J. Beksi
   Amount: $158,978. Period: September 2023 - August 2026
3. Towards Robot Understanding: Embodying Causal Graphical Models into Robotics
   Google
   CAHSI-Google Institutional Research Program
   PI: William J. Beksi. Co-PI: Dongchul Kim.
   Amount: $100,000 (UTA portion: $58,966). Period: September 2023 - August 2024
4. Resilient Multi-Vehicle Networks
   U.S. Department of Defense
   Research and Education Program for HBCUs/MSIs
   PI: Animesh Chakravarthy. Co-PIs: William J. Beksi, Kamesh Subbarao.
   Amount: $799,680. Period: May 2023 - May 2027
5. USDA ARS Research Apprenticeship Program at University of Texas at Arlington
   U.S. Department of Agriculture
   PI: Jianzhong Su. Co-PIs: William J. Beksi, Gautam Das, Keaton Hamm, Hong Jiang, Chengkai Li, Ren-Cang Li, Suvra Pal, Bryan Samuel, Li Wang, Shuo Wang.
   Amount: $400,000. Period: August 2022 - September 2024

External Research Grants (Completed)

1. CRII: RI: Topological Methods for Robotic Perception
   National Science Foundation
   PI: William J. Beksi
   Amount: $175,000. Period: April 2020 - March 2023
   - NSF REU Supplement. Amount: $16,000. Period: 2020 - 2023
2. A Neuromorphic Stereo Vision System for On-Orbit Object Acquisition
   U.S. Space Force, Phase I STTR
   Orbital Prime: Open Call for Innovative Defense-Related Dual-Purpose Technologies/Solutions (AF21S-TCSO1)
   PI: William J. Beksi. SBC: krtkl (Ryan Cousins)
   Amount: $250,000 (UTA portion: $125,000). Period: September 2022 - February 2023
3. An Adaptable, Cost-Effective, Real-Time 3D Vision System for Advanced Manufacturing
   U.S. Air Force, Phase I STTR
   Advanced Manufacturing and Sustainment Technologies and Processes (AF21A-TCSO2)
   PI: William J. Beksi. SBC: krtkl (Ryan Cousins)
   Amount: $150,000 (UTA portion: $50,000). Period: February 2022 - August 2022

Internal Research Grants

1. Automated In Situ Segmentation of Sugarcane Roots
   University of Texas at Arlington Research Experiences for Undergraduates Program
   PI: William J. Beksi
   Amount: $2,000. Period: 2023 - 2024
2. Event-Based Visual Inertial Odometry for Mobile Robots
   University of Texas at Arlington Research Experiences for Undergraduates Program
   PI: William J. Beksi
   Amount: $2,000. Period: 2022 - 2023
3. An Immersive Teleoperation System for Robot Navigation
   University of Texas at Arlington Research Experiences for Undergraduates Program
   PI: William J. Beksi
   Amount: $2,000. Period: 2021 - 2022
4. Vision-Based Collision Avoidance for Unmanned Aerial Vehicles
   University of Texas at Arlington Research Enhancement Program
   PI: William J. Beksi. Co-PI: Animesh Chakravarthy
   Amount: $15,000. Period: June 2020 - August 2021

Publications

Publication details are available at `https://ranger.uta.edu/ wjbeksi/`

Journal Articles

Note: My lab members are marked with *.

J8. J.A. James*, H.K. Manching, M.R. Mattia, K.D. Bowman, A.M. Hulse-Kemp, and W.J. Beksi. CitDet: A Benchmark Dataset for Citrus Fruit Detection, *IEEE Robotics and Automation Letters*, (under review) 2024.

J7. M.A.A Muzaddid* and W.J. Beksi. NTrack: A Multiple-Object Tracker and Dataset For Infield Cotton Boll Counting, *IEEE Transactions on Automation Science and Engineering*, pp. 1-13, 2023.

J6. M.S. Arshad* and W.J. Beksi. IPVNet: Learning Implicit Point-Voxel Features for Open-Surface 3D Reconstruction, *Journal of Visual Communication and Image Representation*, 97, 2023.

J5. M. Davoodi, A. Iqbal, J.M. Cloud*, W.J. Beksi, and N.R. Gans. Rule-Based Safe Probabilistic Movement Primitive Control via Control Barrier Functions, *IEEE Transactions on Automation Science and Engineering*, pp. 1-15, 2022.

J4. K. Dhal, P. Karmokar*, A. Chakravarthy, and W.J. Beksi. Vision-Based Guidance for Tracking Multiple Dynamic Objects, *Journal of Intelligent & Robotic Systems*, 105, 2022.

J3. M. Davoodi, A. Iqbal, J.M. Cloud*, W.J. Beksi, and N.R. Gans. Safe Robot Trajectory Control using Probabilistic Movement Primitives and Control Barrier Functions, *Frontiers in Robotics and AI*, 9, 2022.

J2. W.J. Beksi and N. Papanikolopoulos. A Topology-based Descriptor for 3D Point Cloud Modeling: Theory and Experiments, *Image and Vision Computing*, 88, pp. 84-95, 2019.

J1. D. Fehr, W.J. Beksi, D. Zermas, and N. Papanikolopoulos. Covariance Based Point Cloud Descriptors for Object Detection and Recognition, *Computer Vision and Image Understanding*, 142, pp. 80-93, 2016.

Conference Proceedings (Refereed)

Note: The presenter is underlined.

C27. J.A. James*, H.K. Manching, A.M. Hulse-Kemp, and W.J. Beksi. Few-Shot Fruit Segmentation via Transfer Learning, *IEEE International Conference on Robotics and Automation (ICRA)*, Yokohama, Japan, 2024

C26. M.S. Arshad* and W.J. Beksi. LIST: Learning Implicitly from Spatial Transformers for Single-View 3D Reconstruction, *IEEE/CVF International Conference on Computer Vision (ICCV)*, Paris, France, pp. 9321-9330, 2023.

C25. J.M. Cloud*, M.Q. Tram*, W.J. Beksi, and M.A. DuPuis. Lunar Excavator Mission Operations using Dynamic Movement Primitives, *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Detriot, USA, pp. 10708-10715, 2023.

C24. M.Q. Tram*, J.M. Cloud*, and W.J. Beksi. Intuitive Robot Integration via Virtual Reality Workspaces, *IEEE International Conference on Robotics and Automation (ICRA)*, London, UK, pp. 11654-11660, 2023.

C23. Z. Lyu*, N.B. Gutierrez*, and W.J. Beksi. MetaMax: Improved Open-Set Deep Neural Networks via Weibull Calibration, *IEEE/CVF Winter Conference on Applications of Computer Vision (WACV) Workshops*, Waikoloa, USA, pp. 439-443, 2023.

C22. Q.H. Nguyen* and W.J. Beksi. Single Image Super-Resolution via a Dual Interactive Implicit Neural Network, *IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)*, Waikoloa, USA, pp. 4936-4945, 2023.

C21. M.S. Arshad* and W.J. Beksi. Automated Reconstruction of 3D Open Surfaces from Sparse Point Clouds, *IEEE International Symposium on Mixed and Augmented Reality (ISMAR) Workshops*, Singapore, pp. 216-221, 2022.

C20. M.A.A Muzaddid* and W.J. Beksi. Variable Rate Compression for Raw 3D Point Clouds, *IEEE International Conference on Robotics and Automation (ICRA)*, Philadelphia, USA, pp. 8748-8755, 2022.

C19. N.B. Gutierrez* and W.J. Beksi. Thermal Image Super-Resolution Using Second-Order Channel Attention with Varying Receptive Fields, *International Conference on Computer Vision Systems (ICVS)*, virtual event, pp. 3-13, 2021. **Best Conference Paper Award Finalist**.

C18. M. Davoodi, J.M. Cloud*, A. Iqbal, W.J. Beksi, and N.R. Gans. Safe Human-Robot Coetaneousness Through Model Predictive Control Barrier Functions and Motion Distributions, *Modeling, Estimation, and Control Conference (MECC)*, Austin, USA, pp. 271-277, 2021.

C17. Z. Lyu*, N.B. Gutierrez*, and W.J. Beksi. An Uncertainty Estimation Framework for Probabilistic Object Detection, *IEEE International Conference on Automation Science and Engineering (CASE)*, Lyon, France, pp. 1441-1446, 2021.

C16. M. Davoodi, A. Iqbal, J.M. Cloud*, W.J. Beksi, and N.R. Gans. Probabilistic Movement Primitive Control via Control Barrier Functions, *IEEE International Conference on Automation Science and Engineering (CASE)*, Lyon, France, pp. 697-703, 2021. **Best Conference Paper Award Finalist**.

C15. P. Karmokar*, K. Dhal, W.J. Beksi, and A. Chakravarthy. Vision-Based Guidance for Tracking Dynamic Objects, *International Conference on Unmanned Aircraft Systems (ICUAS)*, Athens, Greece, pp. 1106-1115, 2021.

C14. R.E. Rivadeneira, A.D. Sappa, B.X. Vintimilla, S. Nathan, P. Kansal, A. Mehri, P.B. Ardakani, A. Dalal, A. Akula, D. Sharma, S. Pandey, B. Kumar, J. Yao, R. Wu, K. Feng, N. Li, Y. Zhao, H. Patel, V. Chudasama, K. Prajapati, A. Sarvaiya, K.P. Upla, K. Raja, R. Ramachandra, C. Busch, F. Almasri, T. Vandamme, O. Debeir, N.B. Gutierrez*, Q.H. Nguyen*, and W.J. Beksi. Thermal Image Super-Resolution Challenge - PBVS 2021, *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) Workshops*, virtual event, pp. 4359-4367, 2021.

C13. C. Collander, W.J. Beksi, and M. Huber. Learning the Next Best View for 3D Point Clouds via Topological Features, *IEEE International Conference on Robotics and Automation (ICRA)*, Xi'an, China, pp. 12207-12213, 2021.

C12. M.S. Arshad* and W.J. Beksi. A Progressive Conditional Generative Adversarial Network for Generating Dense and Colored 3D Point Clouds, *International Conference on 3D Vision (3DV)*, virtual event, pp. 712-722, 2020.

C11. Z. Lyu*, N. Gutierrez*, A. Rajguru*, and W.J. Beksi. Probabilistic Object Detection via Deep Ensembles, *Beyond mAP: Reassessing the Evaluation of Object Detectors, European Conference on Computer Vision (ECCV) Workshops*, Glasgow, UK, pp. 67-75, 2020.

C10. R.E. Rivadeneira, A.D. Sappa, B.X. Vintimilla, L. Guo, J. Hou, A. Merhi, P. Behjati, A.H. Patel, V. Chudasama, K. Prajapati, K.P. Upla, R. Ramachandra, K. Raja, C. Busch, F. Almasri, O. Debeir, S. Nathan, P. Kansal, N. Gutierrez*, B. Mojra, and W.J. Beksi. Thermal Image Super-Resolution Challenge - PBVS 2020, *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) Workshops*, Seattle, USA, pp. 96-97, 2020.

C9. A. Rajguru*, C. Collander, and W.J. Beksi. Camera-Based Adaptive Trajectory Guidance via Neural Networks, *International Conference on Mechatronics and Robotics Engineering (ICMRE)*, Barcelona, Spain, pp. 155-159, 2020. **Best Presentation Award**.

C8. W.J. Beksi and N. Papanikolopoulos. Signature of Topologically Persistent Points for 3D Point Cloud Description, *IEEE International Conference on Robotics and Automation (ICRA)*, Brisbane, Australia, pp. 3229-3234, 2018.

C7. W.J. Beksi and N. Papanikolopoulos. 3D Region Segmentation Using Topological Persistence, *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Daejeon, Korea, pp. 1079-1084, 2016.

C6. W.J. Beksi and N. Papanikolopoulos. 3D Point Cloud Segmentation Using Topological Persistence, *IEEE International Conference on Robotics and Automation (ICRA)*, Stockholm, Sweden, pp. 5046-5051, 2016.

C5. W.J. Beksi, J. Spruth, and N. Papanikolopoulos. CORE: A Cloud-Based Object Recognition Engine for Robotics, *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Hamburg, Germany, pp. 4512-4517, 2015.

C4. W.J. Beksi and N. Papanikolopoulos. Object Classification Using Dictionary Learning and RGB-D Covariance Descriptors, *IEEE International Conference on Robotics and Automation (ICRA)*, Seattle, USA, pp. 1880-1885, 2015.

C3. W.J. Beksi and N. Papanikolopoulos. Point Cloud Culling for Robot Vision Tasks Under Communication Constraints, *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Chicago, USA, pp. 3747-3752, 2014.

C2. D. Fehr, W.J. Beksi, D. Zermas, and N. Papanikolopoulos. Occlusion Alleviation through Motion Using a Mobile Robot, *IEEE International Conference on Robotics and Automation (ICRA)*, Hong Kong, China, pp. 3179-3184, 2014.

C1. D. Fehr, W.J. Beksi, D. Zermas, and N. Papanikolopoulos. RGB-D Object Classification Using Covariance Descriptors, *IEEE International Conference on Robotics and Automation (ICRA)*, Hong Kong, China, pp. 5467-5472, 2014.

Patents

P2. Robot Integration via Virtual Reality Workspaces. U.S. Provisional Application No. 63/468,574. Filing date: May 24, 2023.

P1. Systems and Methods for Multi-Object Tracking. U.S. Provisional Application No. 63/498,835. Filing date: April 28, 2023.

Invited Talks

- Materials and Manufacturing Directorate, Air Force Research Laboratory, 2023
- First Workshop on Photorealistic Image and Environment Synthesis for Computer Vision, WACV 2023
- Workshop on Emerging Topological Techniques in Robotics, ICRA 2016

Contributions to Teaching

Classroom Teaching

University of Texas at Arlington

- CSE 4308/5360: Artificial Intelligence I, Fall 2023 (Enrollment: 57)
- CSE 4308/5360: Artificial Intelligence I, Fall 2022 (Enrollment: 56)
- CSE 6367: Computer Vision, Spring 2022 (Enrollment: 19)
- CSE 4308/5360: Artificial Intelligence I, Fall 2021 (Enrollment: 48)
- CSE 6367: Computer Vision, Spring 2021 (Enrollment: 25)
- CSE 4308/5360: Artificial Intelligence I, Fall 2020 (Enrollment: 32)
- CSE 6367: Computer Vision, Spring 2020 (Enrollment: 16)
- CSE 4308/5360: Artificial Intelligence I, Fall 2019 (Enrollment: 50)
- CSE 6367: Computer Vision, Spring 2019 (Enrollment: 36)
- CSE 4308/5360: Artificial Intelligence I, Fall 2018 (Enrollment: 62)

University of Minnesota

- CSci 4041: Algorithms and Data Structures, Fall 2016, (Teaching Assistant)
- CSci 5561: Computer Vision, Spring 2016, (Teaching Assistant)
- CSci 5551: Introduction to Intelligent Robotic Systems, Fall 2015, (Teaching Assistant)
- CSci 4141H: Honors Algorithms and Data Structures, Fall 2014, (Teaching Assistant)
- CSci 4511W: Artificial Intelligence, Spring 2014, (Teaching Assistant)
- CSci 5511: Artificial Intelligence I, Fall 2013, (Teaching Assistant)

Advising

Ph.D. Alumni

- Mohammad Samiul Arshad, Ph.D., 2023
  Dissertation: Generative and Implicit Methods for 3D Point Cloud Processing

Master's Alumni

- Marcus A. Hawkins, M.S., 2024
  Thesis: Manifold Learning in Robotics: A Tutorial and Survey
- Minh Q. Tram, M.S., 2022
  Thesis: Intuitive Robot Integration via Virtual Reality Workspaces

Ph.D. Advisees (current)

- Joseph Cloud (NSF GRFP Fellow)
- Nolan Gutierrez (DoD SMART Scholar)
- Jordan James
- Pritam Karmokar
- Zongyao Lyu
- Md Ahmed Al Muzaddid
- Quan Nguyen
- Joseph Salas-Leon
- Angel Solis
- Minh (Jerry) Tram (DoD SMART Scholar)

Ph.D. Thesis Committee Member

- Brian Cook: Department of Computer Science and Engineering, University of Texas at Arlington (Advisor: Manfred Huber)
- Reza Ghoddoosian: Department of Computer Science and Engineering, University of Texas at Arlington (Advisor: Vassilis Athitsos)
- Kashish Dhal: Department of Mechanical and Aerospace Engineering, University of Texas at Arlington (Advisor: Animesh Chakravarthy)
- Saif Sayed: Department of Computer Science and Engineering, University of Texas at Arlington (Advisor: Vassilis Athitsos)
- Mohammad Zakizadehghariehali: Department of Computer Science and Engineering, University of Texas at Arlington (Advisor: Fillia Makedon)

- Soumik Mohian: Department of Computer Science and Engineering, University of Texas at Arlington (Advisor: Christoph Csallner)
- Saif Sayed: Department of Computer Science and Engineering, University of Texas at Arlington (Advisor: Vassilis Athitsos)
- Ashish Jaiswal: Department of Computer Science and Engineering, University of Texas at Arlington (Advisor: Fillia Makedon)
- Christos Sevastopoulos: Department of Computer Science and Engineering, University of Texas at Arlington (Advisor: Fillia Makedon)

Contributions to Service

Professional Contributions

Leadership Roles

- Workshop Organizer:
  - "First Workshop on Photorealistic Image and Environment Synthesis for Robotics," IROS 2023
- Conference Session Chair:
  - "RGB-D Perception I," ICRA 2022
  - "Stereo Vision Applications," ICRA 2021
- Faculty Chair:
  - "Space Robotics for In-Situ Resource Utilization Needs, Challenges, and Approaches," IROS 2020

Editorial Boards

- Guest Editor: Drones special issue on Artificial Intelligence and Machine Learning in UAV Technology (2024)
- Associate Editor: IEEE Transactions on Automation Science and Engineering (2024-2025)
- Associate Editor: IEEE International Conference on Robotics and Automation (2024)
- Associate Editor: IEEE/RSJ International Conference on Intelligent Robots and Systems (2023, 2024)
- Associate Editor: International Conference on Ubiquitous Robots (2020-2024)
- Program Committee: International Conference on Computer Vision Systems (2023)

Professional Service

- Member of the Standard for Measuring Robot Agility (IEEE P2940) working group
- Proposal Reviewer and Panelist for the National Science Foundation
- Proposal Reviewer for the Army Research Office
- Reviewer:
  ACM Transactions on Human-Robot Interaction (THRI); Autonomous Robots (AURO); Computers and Electronics in Agriculture; Computer Vision and Image Understanding (CVIU); Conference on Neural Information Processing Systems (NeurIPS); Engineering Applications of Artificial Intelligence (EAAI); European Conference on Computer Vision (ECCV); IEEE International Conference on Robotics and Automation (ICRA); IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS); IEEE International Conference on Automation Science and Engineering (CASE); IEEE International Conference on Computer Vision (ICCV);

IEEE/CVF Winter Conference on Applications of Computer Vision (WACV); IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR); IEEE Robotics and Automation Letters (RA-L); IEEE Transactions on Automation Science and Engineering (T-ASE); IEEE Transactions on Intelligent Transportation Systems (T-ITS); IEEE Transactions on Robotics (T-RO); Image and Vision Computing (IMAVIS); Machine Vision and Applications (MVAP)

Departmental Service

2023 - 2024

- Senior Design Review Committee
- Colloquia Committee

2022 - 2024

- Faculty Search Committee

2022

- Undergraduate REU Committee

2021 - 2022

- Industry Outreach Committee

2020 - 2022

- Broadening Participation in Computing Committee

2018 - 2020

- Faculty Search Committee
- Ph.D. Admissions Committee