Jnaneshwar Das — Curriculum Vitæ

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RESEARCH INTERESTS

Field robotics, machine learning, autonomous systems, unpiloted vehicles, environmental monitoring, precision agriculture, marine ecosystem monitoring.

EDUCATION

University of Southern California — Los Angeles, California, USA

Ph.D., Computer Science, May 2014
- Dissertation: Data-driven Robotic Sampling for Marine Ecosystem Monitoring
- Advisor: Prof. Gaurav S. Sukhatme

M.S., Computer Science, May 2008
- Specialization: Intelligent Robotics
- Thesis: A Robotic System for Benthic Sampling Along a Transect
- Advisor: Prof. Gaurav S. Sukhatme

P.E.S. Institute of Technology — Bangalore, India
B.E., Telecommunication Engg., 2004

RESEARCH EXPERIENCE

Alberto Enrique Behar Research Professor,
School of Earth and Space Exploration — July 2018 — current
Arizona State University — *Tempe, AZ*

- Director of the Distributed Robotic Exploration and Mapping Systems (DREAMS) Laboratory, developing autonomous exploration systems for spatio-temporal observation of environmental and biological processes, with special focus on exploration of extreme environments such as volcanoes, sub-Antarctic lakes and underwater habitats, and space.

Postdoctoral Researcher, GRASP Laboratory — June 2014 — June 2018
University of Pennsylvania — *Philadelphia, PA*
Sponsor: Dr. Vijay Kumar
- Group leader of a USDA funded initiative to develop robot swarm for persistent monitoring in precision agriculture. More information at https://label.ag

- Co-organizer of NSF Student CPS Challenge. Leading an NSF CPS funded initiative to design a low barrier to entry cloud-enabled UAV swarm testbed to facilitate CPS student competitions. More information at https://openuav.us

Research Assistant, Robotic Embedded Systems Laboratory Jan 2007—May 2014
University of Southern California — *Los Angeles, California*

Worked with a team of researchers on the development of a networked aquatic observing system for inland and coastal waters, consisting of sensor buoys, and autonomous surface and underwater vehicles.

Research Collaborator   May 2009—September 2013
Monterey Bay Aquarium Research Institute (MBARI)   *Moss Landing, California*

Developed methodologies for mixed-initiative data-driven robotic sampling of dynamic oceanographic features such as algal blooms using underwater robots, drifters, and satellite imagery.

Visiting Doctoral Researcher   July 2011—August 2011
École Polytechnique Fédérale de Lausanne (EPFL)   *Lausanne, Switzerland*

Investigated environmental sampling using aerial robots and land-based spectrally-selective sensors.

PROFESSIONAL
EXPERIENCE

Software Developer   July 2004 — July 2006
ThoughtWorks Technologies Pvt. Ltd.   *Bangalore, India*

Designed and developed large-scale distributed enterprise applications using agile methodologies.

JOURNAL AND
MAGAZINE ARTICLES

1. X. Liu, S. W. Chen, C. Liu, S. Skandan, **J. Das**, C. J. Taylor, J. P. Underwood, V. Kumar, "Monocular Camera Based Fruit Counting and Mapping with Semantic Data Association," in IEEE Robotics and Automation Letters, Jan 2019. (accepted for publication)

2. S. W. Chen, S. Skandan, S. Dcunha, **J. Das**, C. Qu, C.J. Taylor, V. Kumar, "Counting Apples and Oranges With Deep Learning: A Data-Driven Approach," in IEEE Robotics and Automation Letters, vol. 2, no. 2, pp. 781-788, April 2017.

3. R. Ehsani, D. Wulfsohn, **J. Das**, I.Z. Lagos, "Yield Estimation: A Low-Hanging Fruit for Application of Small UAS," in ASABE Resource: Engineering & Technology for a Sustainable World, July 2016, pp. 16-18.

4. R. Ehsani and **J. Das**, "Yield estimation in citrus with SUAVs, Citrus Extension Trade Journals, pp. 16-18, 2016

5. **J. Das**, F. Py, H. Harvey, J. Ryan, A. Gellene, R. Graham, D. Caron, K. Rajan, and G. Sukhatme, "Data-driven Robotic Sampling for Marine Ecosystem Monitoring", in *International Journal of Robotics Research, 34(12):1435-1452, Oct 2015.*

6. **J. Das**, F. Py, T. Maughan, T. O'Reilly, M. Messi, J. Ryan, G. Sukhatme, and K. Rajan, "Coordinated Sampling of Dynamic Oceanographic Features with Underwater Vehicles and Drifters", *in International Journal of Robotics Research, Vol. 31, p. 626-646, April 2012.*

7. A. Garcia-Olaya, F. Py, **J. Das**, and K. Rajan, "An On-line Utility based Multi-criteria Approach for Sampling Dynamic Ocean Fields", *in IEEE Journal of Oceanic Engineering, April 2012.*

8. R. Smith, **J. Das**, H. Heidarsson, A. de Menezes Pereira, F. Arrichiello, I. Cetinic, L. Darjany, M. Garneau, M. Howard, C. Oberg, M. Ragan, E. Seubert, E. Smith, B. Stauffer, A. Schnetzer, G. Toro-Farmer, D. Caron, B. Jones, and G. Sukhatme, "USC CINAPS Builds Bridges: Observing and Monitoring the Southern California Bight", *In IEEE Robotics and Automation Magazine, vol. 17, no. 1, pp. 20-30, Mar 2010.*

9. D. Caron, B. Stauffer, S. Moorthi, A. Singh, M. Batalin, E. Graham, M. Hansen, W. Kaiser, **J. Das**, A. de Menezes Pereira, A. Dhariwal, B. Zhang, C. Oberg, and G. Sukhatme, "Macro-to fine-scale spatial and temporal distributions and dynamics of phytoplankton and their environmental driving forces in a small subalpine lake in southern California, USA", *In Journal of Limnology and Oceanography, vol. 53, no. 5, pp. 2333-2349, 2008.*

REFEREED
CONFERENCE PAPERS

1. G. Li, B.T. Gabrich, D.J. Saldana, **J. Das**, V. Kumar, M. Yim, "ModQuad-Vi: A Vision-Based Self-Assembling Modular Quadrotor", *accepted in IEEE International Conference on Robotics and Automation (ICRA), 2019.*

2. X. Liu, S. W. Chen, S. Aditya, N. Sivakumar, S. Dcunha, C. Qu, C.J. Taylor, **J. Das**, and V.Kumar, "Robust Fruit Counting: Combining Deep Learning, Tracking, and Structure from Motion", accepted in International Conference on Intelligent Robots and Systems (IROS) 2018.

3. M. Schmittle, A. Lukina, L. Vacek, **J. Das**, C. P. Buskirk, S. Rees, J. Sztipanovits, R. Grosu and V. Kumar, "OpenUAV: A UAV Testbed for the CPS and Robotics Community," 2018 International Conference on Cyber-Physical systems (ICCPS), Porto, Portugal, pp. 130-139.

4. L. Vacek, E. Atter, P. Rizo, B. Nam, R. Kortvelesy, D. Kaufman, **J. Das**, V. Kumar, "sUAS for deployment and recovery of an environmental sensor probe," 2017 International Conference on Unmanned Aircraft Systems (ICUAS), Miami, FL, USA, 2017, pp. 1022-1029.

5. D. Orol, **J. Das**, L. Vacek, I. Orr, M. Paret, C.J. Taylor, V. Kumar, "An aerial phyto-biopsy system: Design, evaluation, and lessons learned," 2017 International Conference on Unmanned Aircraft Systems (ICUAS), Miami, FL, USA, 2017, pp. 188-195.

6. S. K. Sarkar, **J. Das**, R. Ehsani and V. Kumar, "Towards autonomous phytopathology: Outcomes and challenges of citrus greening disease detection through close-range remote sensing," 2016 IEEE International Conference on Robotics and Automation (ICRA), Stockholm, 2016, pp. 5143-5148.

7. **J. Das**, G. Cross, C. Qu, A. Makineni, P. Tokekar, Y. Mulgaonkar, V. Kumar, "Devices, Systems, and Methods for Automated Monitoring enabling Precision Agriculture," in IEEE International Conference on Automation Science and Engineering (CASE), vol., no., pp.462-469, 24-28 Aug. 2015

8. P. Ngo, **J. Das**, J. Ogle, J. Thomas, W. Anderson and R. N. Smith, "Predicting the speed of a Wave Glider autonomous surface vehicle from wave model data," 2014 IEEE/RSJ International Conference on Intelligent Robots and Systems, Chicago, IL, 2014, pp. 2250-2256.

9. K. Gomes, D. Cline, D. Edgington, M. Godin, T. Maughan, M. McCann, T. OReilly, F. Bahr, F. Chavez, M. Messié, **J. Das**, K. Rajan, "ODSS: A Decision Support System for Ocean Exploration", *In 29th IEEE International Conference on Data Engineering, Workshop on Data-Driven Decision Guidance and Support Systems (DGSS) 2013.*

10. **J. Das**, J. Harvey, F. Py, H. Vathsangam, R. Graham, K. Rajan, and G. Sukhatme, "Hierarchical Probabilistic Regression for AUV-based Adaptive Sampling of Marine Phenomena, *In IEEE International Conference on Robotics and Automation, 2013.*

11. W. Al-Sabban, **J. Das**, and R. N. Smith, "Persistent robot tasking for environmental monitoring through crowd-sourcing," 2013 OCEANS - San Diego, San Diego, CA, 2013, pp. 1-6

12. **J. Das**, W. Evans, M. Minnig, A. Bahr, G. Sukhatme, and A. Martinoli, "Environmental Sensing using Land-based Spectrally-selective Cameras and a Quadcopter", *In 13th International Symposium on Experimental Robotics, 2012.*

13. R. Graham, F. Py, **J. Das**, D. Lucas, and K. Rajan, "Exploring Space-Time Tradeoffs in Autonomous Sampling for Marine Robotics", in 13th International Symposium on Experimental Robotics, 2012.

14. R. Smith, **J. Das**, G. Hine, W. Anderson, and G. Sukhatme, "Predicting Wave Glider Speed from Environmental Measurements", In MTS/IEEE OCEANS '11, Kona, Hawaii, Sep 2011.

15. **J. Das**, T. Maughan, M. McCann, M. Godin, T. O'Reilly, M. Messi, F. Bahr, K. Gomes, F. Py, J. Bellingham, G. Sukhatme, and K. Rajan, "Towards Mixed-initiative, Multi-robot Field Experiments: Design, Deployment, and Lessons Learned", *In IEEE/RSJ International Conference on Intelligent Robots and Systems, 2011.*

16. **J. Das**, F. Py, T. Maughan, T. O'Reilly, M. Messi, J. Ryan, K. Rajan, and G. Sukhatme, "Simultaneous Tracking and Sampling of Dynamic Oceanographic Features with AUVs and Drifters", In 12th International Symposium on Experimental Robotics, 2010, Dec 2010.

17. R. Smith, **J. Das**, Y. Chao, D. Caron, B. Jones, and G. Sukhatme, "Cooperative Multi-AUV Tracking of Phytoplankton Blooms based on Ocean Model Predictions", In Oceans '10 - IEEE Sydney, Sydney, Australia, May 2010.

18. **J. Das**, K. Rajan, S. Frolov, J. Ryan, F. Py, D. Caron, and G. Sukhatme, "Towards Marine Bloom Trajectory Prediction for AUV Mission Planning", In IEEE International Conference on Robotics and Automation, pp. 4784 - 4790 , May 2010.

19. F. Arrichiello, **J. Das**, H. Heidarsson, A. de Menezes Pereira, S. Chiaverini, and G. Sukhatme, "Multi-Robot Collaboration with Range-Limited Communication: Experiments with Two Underactuated ASVs", In The 7th International Conference on Field and Service Robots, Cambridge, Massachusetts, Jul 2009.

20. **J. Das**, and G. Sukhatme, "A Robotic Sentinel for Benthic Sampling along a Transect", In IEEE International Conference on Robotics and Automation, pp. 206 - 213 , May 2009.

21. R. Smith, B. Stauffer, **J. Das**, H. Heidarsson, A. de Menezes Pereira, Y. Chao, L. Darjany, I. Cetinic, D. Estrin, C. Oberg, M. Ragan, B. Jones, G. Sukhatme, and D. Caron, "Design and Implementation of Sensor Networks for the Observation and Research of Harmful Algal Blooms in Southern California Coastal Waters", *In Proceedings of the Conference on Coastal Environmental Sensing Networks, pp. 5-7, Boston, MA, Jul 2009.*

22. M. Gupta, **J. Das**, M. Vieira, H. Heidarsson, H. Vathsangam, and G. Sukhatme, "Collective Transport of Robots: Emergent Flocking from Minimalist Multi-robot Leader-following", In IEEE/RSJ International Conference on Intelligent Robots and Systems, 2009.

23. F. Arrichiello, D. Liu, S. Yerramalli, A. de Menezes Pereira, **J. Das**, U. Mitra, and G. Sukhatme, "Effects of underwater communication constraints on the control of marine robot teams", In International Conference on Robot Communication and Coordination, Odense, Denmark, Mar 2009

24. A. de Menezes Pereira, **J. Das**, and G. Sukhatme, "An Experimental Study of Station Keeping on an Underactuated ASV", In IEEE/RSJ International Conference on Intelligent Robots and Systems, pp. 3164-3171, 2008.

Dissertation   Data-driven Robotic Sampling for Marine Ecosystem Monitoring. *Ph.D. dissertation, Computer Science, Viterbi School of Engineering, University of Southern California, Los Angeles, CA, USA, May 2008.*

Patents

- Systems, Devices, and Methods for Robotic Remote Sensing for Precision Agriculture, V.Kumar, G. Cross, C. Qu, J. Das, A. Makineni, Y. Mulgaonkar; US Patent App. 15/545,266, 2017.

- Systems, Devices, and Methods for Agricultural Sample Collection, D. Orol, L. Vacek, D. Kaufman, J. Das, V. Kumar; US Patent App. 15/974,243, 2018.

Sampling of Invited Talks and Demonstrations

- National Institute of Oceanography (NIO), Goa, India, 2010.
- Autonomous Systems Lab, ETH Zurich, Switzerland, 2011.
- GRASP Special Seminar, University of Pennsylvania, "Data-driven Robotic Sampling for Marine Ecosystem Monitoring", January 2014.
- Google Los Angeles, Venice Beach, California, "Robotic Explorers for Environmental Monitoring", May 2014.
- Workshop for UAV Applications in Agriculture, Lake Alfred, Florida, "Autonomous Aerial Robots for Precision Agriculture", March 2015.
- Special Session on UAVs for Applications in Plant Pathology, American Phytopathological Society (APS) Meeting, Pasadena, California, "Autonomous Aerial Robots for Precision Agriculture", August 2015.
- Invited talk at North Florida Research and Education Center, University of Florida, "Autonomous Aerial Robots for Precision Agriculture", January 2016.
- Invited demonstration and interactive session at the Congressional Robotics Caucus for Fifth anniversary of the National Robotics Initiative, U.S. Capitol Complex, June 2016.

- CPS Frontiers Projects Panel talk at NSF CPS PI meeting, "UAV testbed for the CPS community", October 2016.
- Workshop on CPS Challenges for Unmanned and Autonomous Systems at the NSF PI meeting, NSF CPS PI Meeting, "OpenUAV: CPS Testbed for Aerial Autonomy", November 2017.
- Invited talk at Phenome 2019, Tucson, AZ, "Robots in the Wild – Collaborative Exploration and Mapping", February 2019.

AWARDS

- Alberto Enrique Behar Research Professorship, ASU School of Earth and Space Exploration, (May 2018)
- NSF award for extended research visit of the Distributed Intelligent Systems and Algorithms Laboratory (DISAL) at the École Polytechnique Fédérale de Lausanne (EPFL) in Lausanne, Switzerland (July 2011 - September 2011)
- NSF award to attend International Joint Conferences on Artificial Intelligence (IJCAI) 2011 Doctoral Consortium in Barcelona, Spain

MENTORING

Ph.D. students: Zhiang Chen (ASU), Sarah Bearman (ASU), Steven Chen, Ty Nguyen, Kelsey Saulnier, Kate Tolstaya.
Masters students: Harish Anand (ASU), Xu Liu, Chenhao Liu, Arjun Kumar, Shreyas Aditya, Shreyas Skandan, Wei-Yin Ko, Anuj Panda, Abhijeet Singh, Arjun Kumar, Nivedha Sivakumar, Pedro Rizo. Tyler Altenhofen (Submatriculation).
Undergraduate students: Lukas Vacek, Daniel Orol, Delaney Kaufman, Edidiong Okon, Spencer Fox, Matthew Schmittle, DaVonne Henry (REU), Jacob Beckerman, Farirai Baya, Sandeep Dcunha, Rishab Jaggi, Ryan Kortvelesy.
High school students: Suproteem Sarkar, Isabella Orr, Bharath Nagarajan, Surya Dhir, Baasim Kazi.

PROFESSIONAL
ACTIVITIES

Event Organization:
- Co-organizer of "USC Water Institute Graduate Student Symposium on Ocean Observing and Monitoring", University of Southern California, Los Angeles, CA, May 2012
- Co-organizer of "Robotics Sciences and Systems (RSS) 2014 Workshop on Robotic Monitoring", Berkeley, CA, July 2014
- Co-organizer of "International Conference on Robotics and Automation (ICRA) 2015 Workshop on Robotics in Agriculture", Seattle, Washington, May 2015

Reviewing: NSF panel, NIFA ad-hoc panel, IEEE Transactions on Robotics, Journal of Field Robotics, Autonomous Robots, IEEE Journal of Oceanic Engineering, IEEE International Conference on Robotics and Automation, IEEE/RSJ International Conference on Intelligent Robots and Systems, Robotics Science and Systems, AAAI Conference on Artificial Intelligence, International Symposium on Experimental Robotics, Symposium on Distributed Autonomous Robotic Systems.

Program Committee Member: International Symposium on Multi-Robot and Multi-Agent Systems (MRS) 2019, Associate Editor of IEEE International Conference on Robotics and Automation (ICRA) 2016 and 2017, International Symposium on Experimental Robotics (ISER) 2014, AAAI Conference on Artificial Intelligence 2014, AAAI Conference on Artificial Intelligence 2015, Robotics Sciences and Systems (RSS) 2015, International Joint Conference on Artificial Intelligence (IJCAI) 2016.

Journal Editing: Guest Editor of Journal of Field Robotics (JFR) Special Issue on Agricultural Robotics, 2017.

PERSONAL

Nationality	Indian
Visa Status	Academic H-1B

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