Curriculum Vitae

# ABHISHEK PHADKE

Texas A&M University-Corpus Christi
Department of Computer Science
Conrad Blucher Institute of Surveying and Science
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## EDUCATION

2019 – present **PhD Candidate (ABD status)**, Department of Computer Science,
Texas A&M University-Corpus Christi, Corpus Christi, Texas, USA
Emphasis on System resilience, robotics, cybersecurity, mobile, and distributed computing.

2017 – 2019 **Master of Science** in Electrical Engineering. Texas A&M University-Kingsville
Emphasis on Renewable energy generation and transmission, Electrical machines, Blockchain Development

2012 **–** 2017 **Bachelor of Engineering** in Electronics Engineering, Computer Science (Minor).
University of Mumbai, India (B.S. Equivalent)

## ACADEMIC EMPLOYMENT

2020 – present **Research Assistant** at Conrad Blucher Institute of Surveying and Science,
Texas A&M University-Corpus Christi, Texas, USA
Geospatial Optimization and Analytics Lab (GOAL) Headed by: (Dr. F. Antonio Medrano)

01/2020-08/2020 **Adjunct Faculty**, Department of Engineering, Texas A&M University-Corpus Christi
Texas, USA

08/2020- 12/2020 **Research Assistant** at Department of Computer Science,
Texas A&M University-Corpus Christi, Texas, USA

05/2019- 08/2019 **Instructor** in Upward Bound Rural, Upward Bound Math & Science programs
Texas A&M University – Kingsville, Texas, USA

08/20218- 12/2018 **Teaching Assistant** at the Department of Electrical and Computer Engineering,
Texas A&M University–Kingsville, Texas, USA

## NON-ACADEMIC EMPLOYMENT

04/2018 – 08/2018 **Orientation Leader**, Admissions and Recruitment Office, Texas A&M University – Kingsville, Kingsville, Texas, USA

06/2016 – 07/2017 **Junior Engineer** in R&D, Amber Instruments, Mumbai, India

06/2015 – 05/2016 **Junior Engineer** in Quality Control, Om Energy Savers, Mumbai, India

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## PUBLICATIONS

### PEER REVIEWED JOURNAL ARTICLES

**Phadke, A.**; Medrano, F.A. Increasing Operational Resiliency of UAV Swarms: An Agent-Focused Search and Rescue Framework. **Accepted, Pending publication**, Aerospace Research Communications, Frontier Publishing Partnerships.

**Phadke, A**.; Medrano, F.A.; Sekharan, C.N.; Chu, T. Designing UAV Swarm Experiments: A Simulator Selection and Experiment Design Process. Sensors 2023, 23, 7359. DOI: https://doi.org/10.3390/s23177359

**Phadke, A**.; Medrano, F.A. Examining application-specific resiliency implementations in UAV swarm scenarios. Intelligence & Robotics 2023, 3, 436-461, DOI: http://doi.org/10.20517/ir.2023.27

**Phadke, A**.; Medrano, F.A. Towards Resilient UAV Swarms—A Breakdown of Resiliency Requirements in UAV Swarms. Drones 2022, 6, DOI: https://doi.org/10.3390/drones6110340

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### PEER REVIEWED CONFERENCE PROCEEDINGS

**Phadke, A.**; Antonio Medrano, F.; Chu, T. Engineering resiliency in UAV swarms–A bibliographic analysis. In Proceedings of the Journal of Physics: Conference Series, 2022/08/01, 2022; p. 012007. DOI: 10.1088/1742-6596/2330/1/012007

**Phadke, A.**; Medrano, F.A.; Brahmbhatt, J.; Ustymenko, S. A Framework for an Optimized Smart Energy System. In Proceedings of the 2022 International Symposium on Electrical, Electronics and Information Engineering (ISEEIE), 2022; pp. 240-246. DOI: 10.1109/ISEEIE55684.2022.00049

**Phadke, A.**; Medrano, F.A.; Ustymenko, S. Applications of Blockchain in E-government. In Proceedings of the 2022 International Symposium on Electrical, Electronics and Information Engineering (ISEEIE), 2022; pp. 157-164. DOI: 10.1109/ISEEIE55684.2022.00035

**Phadke, A.**; Medrano, F.A.; Brahmbhatt, J. A conceptual framework for a Blockchain-based Tax payment financial service. In Proceedings of the 2021 International Conference on Computational Science and Computational Intelligence (CSCI), 2021; pp. 1523-1527. DOI: 10.1109/CSCI54926.2021.00296

**Phadke, A.**; Medrano, F.A.; Ustymenko, S. A Review of Vehicular Micro-Clouds. In Proceedings of the 2021 International Conference on Computational Science and Computational Intelligence (CSCI), 2021; pp. 411-417. DOI: 10.1109/CSCI54926.2021.00139

**Phadke, A.**; Ustymenko, S. Updating the Taxonomy of Intrusion Detection Systems. In Proceedings of the 2021 IEEE 45th Annual Computers, Software, and Applications Conference (COMPSAC), 2021; pp. 1085-1091. DOI: 10.1109/COMPSAC51774.2021.00148

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## EDITORIALS, LETTERS AND SHORT ARTICLES

**Phadke, A.**; Boyd, J.; Medrano, F.A.; Starek, M. Navigating the skies: examining the FAA's remote identification rule for unmanned aircraft systems. *Drone Systems and Applications* **2023**, *11*, 1-4, http://dx.doi.org/10.1139/dsa-2023-0029

**Phadke, A.**; Medrano, F.A. A conceptual Blockchain backed framework for Healthcare Data access – Extended abstract series; 2022. https://doi.org/10.20935/AL4944

**Phadke, A**.; Medrano, A. A Resilient Multi-UAV System of Systems (SoS); 2771-9359; 2021. https://doi.org/10.20935/AL1659

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## BOOK CHAPTERS

**Phadke, A**..; Medrano, F.A.; Ustymenko, S.; Chu, T. On the Inclusion of Heterogeneous Agents in Unmanned Vehicle Swarms, The 20th International Conference on Embedded Systems, Cyber-physical Systems, & Applications (ESCS22), July 25th-28,2022, Las Vegas, Nevada. (Accepted, pending publication, delayed)

**Phadke A.** and S. Ustymenko, "Examining Security and Forensics across Database Management Systems", 2021 International Conference on Security and Management (SAM21), July 26th-29,2021, Las Vegas, Nevada. (Accepted, pending publication, delayed)

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## RESEARCH POSTERS

**Phadke A**.; Medrano, F.A. "Drone2Drone: A search and rescue framework for finding lost UAV swarm agents", at the Symposium for Student Innovation, Research, and Creative Activities 2023, Texas A&M University-Corpus Christi, URI: https://tamucc-ir.tdl.org/handle/1969.6/97196

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## SUBMITTED ARTICLES UNDER REVIEW

**Phadke, A**. et.al. An Analysis of Trends in UAV Swarm Performance Research Studies: Simulation Versus Hardware Experiments**,** Submitted to Drone Systems and Applications, Canadian Science Press

An additional four journal articles and two conference proceeding articles on robotic swarms, disruption modeling, and systemic resilience are being prepared for submission, with expected publication dates before August 2024.

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## PRESENTATIONS, INVITED TALKS AND LECTURES

*Unmanned Aerial Systems: From Foundations to the Future*, Guest talk at Montana Technological University, UAS development & analytics undergraduate certificate, September 14th, 2023

*Drone2Drone (D2D): a Search and Rescue framework module for finding lost UAV swarm agents*, The 21st International Conference on Embedded Systems, Cyber-physical Systems, & Applications (ESCS23), July 24th-27,2023, Las Vegas, Nevada

*On the Inclusion of Heterogeneous Agents in Unmanned Vehicle Swarms*, The 20th International Conference on Embedded Systems, Cyber-physical Systems, & Applications (ESCS22), July 25th-28,2022, Las Vegas, Nevada

*Engineering resiliency in UAV Swarms- A bibliographic analysis*, 2022 International Symposium on Intelligent Unmanned Systems and artificial Intelligence (SIUSAI 2022) April 22-24, 2022. *(Virtual)*

*A Framework for an Optimized Smart Energy System*, 2022 International Symposium on Electrical, Electronics and Information Engineering (ISEEIE), February 25-27. *(Virtual)*

*Applications of Blockchain in E-government*, 2022 International Symposium on Electrical, Electronics and Information Engineering (ISEEIE), February 25-27. (Virtual)

*A Conceptual Framework for a Blockchain-based Tax payment Financial Service*. 2021 International Conference on Computational Science and Computational Intelligence (CSCI 2021), December 15-17, *(Virtual)*

*A Review of Vehicular Micro Clouds* 2021 International Conference on Computational Science and Computational Intelligence (CSCI 2021), December 15-17, *(Virtual)*

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## AWARDS AND GRANTS

**Total to date: $60,000**

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| Fall 2023 to Spring 2024 | Division of Research and Innovation, Texas A&M University-Corpus Christi Student research grant. |
| Fall 2023 to Spring 2024 | International Graduate Scholarship - Texas A&M University-Corpus Christi |
| Fall 2023 to Spring 2024 | Islander Leadership Scholarship, Texas A&M University-Corpus Christi |
| April 2023 | 3M thesis competition, University level, Texas A&M University-Corpus Christi, People's Choice Award |
| Spring 2022 | Geospatial Engineering Graduate Scholarship Texas A&M University-Corpus Christi |
| Fall 2022 | Islander Leadership Scholarship, Texas A&M University-Corpus Christi |
| Fall 2021 | CBI endowment- Texas A&M University-Corpus Christi |
| August 2021 to May 2022 | Geospatial Engineering GR Scholarship- Texas A&M University-Corpus Christi |
| August 2021 to May 2022 | International Impact Scholar - Texas A&M university-Corpus Christi |
| September 2021 | Division of Research and Innovation, Texas A&M University-Corpus Christi, Student research Competition award (Equipment Grant) |
| April 2021 | 3M thesis competition, University level, Texas A&M University-Corpus Christi People's Choice award |
| Spring 2021 | Geospatial Engineering GR Scholarship- Texas A&M University-Corpus Christi |
| Spring 2021 | CBI endowment- Texas A&M University-Corpus Christi |
| August 2020 to May 2021 | International Impact Scholar - Texas A&M University-Corpus Christi |
| August 2017 to July 2018 | Graduate Student Merit Scholarship – Texas A&M University-Kingsville |

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## TEACHING

Spring 2020 **EEEN- 3345-001** – Electronic Devices and Circuits
Department of Engineering, Texas A&M University-Corpus Christi

Summer 2019 **Upward Bound** – High School level – Math & Science
Texas A&M University – Kingsville

## PROGRAM SERVICE

09/2021-present **Vice President**
Geospatial Computer Science Graduate Student Organization

09/202-07/2021 **Technical Advisory Chair**
IEEE Student Branch

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## REVIEWER ACTIVITIES

### PEER-REVIEWED JOURNALS

**IEEE Transactions on Mobile Computing**

**IEEE Transactions on Cybernetics**.

**Intelligence and Robotics;** Online ISSN: 2770-3541.

**Eksploatacja i Niezawodność – Maintenance and Reliability.**

**Advances in Networks-Science PG.**

**Reliability Engineering & System Safety;** Online ISSN: 1879-0836

### PEER-REVIEWED REGIONAL AND ANNUAL CONFERENCES

**International Conference on Artificial Intelligence, Computer, Data Sciences and Applications** (ACDSA) 2024

**The 5th International Conference on Machine Learning and Intelligent Systems** (MILIS 2023) (Conference)

**7th Int'l Conf. on Energy Engineering and Environmental Protection**. (Conference)

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## RESEARCH INTERESTS

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|---|---|
| **Resiliency in systems** | Multi-agent modeling, Swarms, Distributed Cyber-Physical Systems, Disruption modeling and threat analysis. |
| **Core Computer Science** | Geospatial algorithms and methods, Spatial data analytics and processing, Distributed computing, Operating Systems, Data structures, and Computer architecture. |
| **Network and Cybersecurity** | Intrusion Detection Systems, Database Management Systems, Network Security |
| **Electrical Engineering** | Energy generation using renewable energy sources, Efficient transmission, Electrical Machines, Electronic devices, and Circuits. |
| **Blockchain** | Applications in E-governance, Smart City, Finance and Healthcare |

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## TECHNICAL SKILLS

**Languages**: Python, Java, C++, Swift.
**Development tools**: MATLAB, XCode, Autodesk, Android Studio, Adobe Creative Studio, Snapchat Lens Studio, Eclipse, Visual Studio, Unreal Engine, Octave.
**Spatial tools**: ArcGIS, Global Mapper, ArcMap.
**Cloud platforms**: Microsoft Azure, AWS.
**Business intelligence**: Tableau, Qlik sense.
**Operating system familiarity**: Windows, Mac OSx, Ubuntu
**PCB design**: Proteus
**Simulation platforms**: CoppeliaSim, Webots, Microsoft AirSim, Gazebo, AnyLogic.
**Spatial Skills**: Geospatial data analysis, spatial database design, spatial computing, spatial networks, UAV mission planning, field data collection.
**Other skills**: Hardware management and design tools, enterprise system management and security, I.T. support, and project management. Renewable energy and green building entrepreneurship, Blockchain development, M.S. Office suite, Database management

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## RESEARCH PROJECTS[1]

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|---|---|
| **08/2023 –11/2024*** | Disruption and threat modeling for performance analysis and validation of aerial CPS. |
| **04/2023 –06/2024*** | Unified Swarm Management And Resource Tracking framework (USMART). |

[1] Each project is expected to produce a minimum of one peer reviewed article or conference proceeding.
* indicates expected project completion dates

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|---|---|
| **04/2023 – 07/2023** | A simulator selection and experiment design process for UAV swarms. |
| **11/2021 – 11/2022** | Swarm-specific agent rescue for increasing operational resilience of nodes in a network. |
| **04/2021 – 01/2022** | Inclusion of heterogeneous agents in swarms as a means of increasing operational robustness. |
| **06/2021 – 09/2021** | Blockchain-based reverse token system for tax payment. |
| **03/2021 – 06/2021** | Optimized smart energy transaction system for renewable energy smart grids. |
| **09/2019 - 03/2024*** | Enabling resilient operations of robotic swarms |

## RESEARCH PROFILES

Google Scholar | ResearchGate | ORCID | Semantic Scholar

## CERTIFICATIONS

**Associate certification** in *CIRTL Network MOOC, An Introduction to Evidence-Based Undergraduate STEM Teaching* from **Texas A&M University** Certification link

Certifications in Electric utility fundamentals, Renewable energy, Digital manufacturing,
Enterprise system management, Advanced manufacturing process analysis, IoT, and embedded systems.
**Transcript**: Click here to visit.

For reference, please contact.

**Dr. F. Antonio Medrano**

- Assistant professor, Geospatial Computer Science, Texas A&M University, Corpus Christi
- Director of the Geospatial Optimization & Analytics Lab (GOAL)
- Dissertation chair, supervisor

- Email: antonio.medrano@tamucc.edu
- Office Phone: (361) 825-2548
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**Dr Tianxing Chu**

- Assistant professor, Geospatial Computer Science, Texas A&M University, Corpus Christi
- Dissertation committee member, teacher

- Email: tianxing.chu@tamucc.edu
- Office Phone: (361) 825-2685
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**Dr. Chandra N Sekharan**

- Department chair & professor, Department of Computer Science
  Texas A&M University, Corpus Christi
- Mentor and Dissertation committee member

- Email: chandra.sekharan@tamucc.edu
- Office Phone: (361) 825-2898
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