

Debejyo Chakraborty, *Ph.D.*

☎ +1 619 838 7334

✉ debejyo@gmail.com

🌐 www.debejyo.com

SUMMARY

Technical expertise for 15+ years in smart manufacturing and future factory research projects as a lead and individual contributor. Deployed complete analytics ecosystems — from data engineering and infrastructure to scalable production algorithms. Solution architect of agile micro-datacenter for multiple groups in GM R&D, delivering high-performance compute with attached petabyte-scale storage. GM contributor for USCAR-53, industrial data communication standard. Recipient of SM Wu Implementation Award, Outstanding Young Manufacturing Engineer, and Boss Kettering award. Inventor on 20+ patents and authored 20+ publications. Core competence includes statistical signal processing, data engineering, database architecture and AI infrastructure development.

EXPERIENCE

Corporate

General Motors R&D, Warren, MI, USA

2011–present

- Staff Researcher (2021–present)
 - Lead internal startup, manage project deliverables, stakeholders, headcount and budget to launch industry first battery cell formation monitoring system for quality prediction.
 - Authored industrial standard
 - Process monitoring algorithm design and implementation (eg. cell manufacturing, MIG welding)
 - Non-destructive evaluation (NDE) for manufactured parts, NDE 4.0
 - Signal processing and statistical/machine learning research
 - Design and build micro-datacenter for big data analytics with fiber backbone
 - Database design and data curation of research and production data
 - Architecture of reconfigurable software for data acquisition and analysis.
- Business Manager (2015–2018)
 - Design & development of budget management tool for R&D
 - OpEx leader
 - Other business operations support for R&D Executive Director.
- Senior Researcher (2014–2021)
 - Process monitoring algorithm design and implementation (eg. ultrasonic and laser welding process)
 - Non-destructive evaluation (NDE) for manufactured parts, NDE 4.0
 - Signal processing and statistical/machine learning research
 - Design and build micro-datacenter for big data analytics with fiber backbone
 - Database design and data curation of research and production data
 - Architecture of reconfigurable software for data acquisition and analysis.

- Researcher (2011–2013)

GME Opel, Mainz-Kastel, Germany 2014

- Manufacturing Design Release Engineer

Advanced Propulsion Center, GM Mfg. Engg., Warren, MI, USA 2013–2014

- Researcher

PROFESSIONAL PREPARATION

Arizona State University, Tempe July 2010

- Ph.D. Electrical Engineering
- M.S. Electrical Engineering

Visveswararajah Technological University, India July 2005

- B.E. Instrumentation Technology

AWARDS & RECOGNITION

SM Wu Implementation Award, SME 2025

Outstanding Young Manufacturing Engineer, SME 2017

Prestige Promoter, General Motors R&D 2017

Cultural Catalyst, General Motors R&D 2015

“Boss” Kettering Award, General Motors 2011

University Graduate Fellowship, Arizona State University 2006-2007

PROFESSIONAL AFFILIATIONS & LEADERSHIP

Current

- **Director (2024-present)**, General Motors Astronomy Club.
- **President & Treasurer (2024-present)**, GM R&D Chapter, Sigma Xi — Leading chapter operations, mentoring researchers, and managing governance.
- **Vice President & Treasurer (2023)**, GM R&D Chapter, Sigma Xi
- **Senior Member**, IEEE — Recognized for technical contributions in signal processing and data analytics.
- **Senior Member**, IEEE Signal Processing Society (SPS).
- **Corporate Member**, Society of Manufacturing Engineers (SME).

Past

- Advisory Committee Member, International Conference on Signal Processing and Integrated Networks (IEEE Conference) — providing guidance on technical programming.
- Ex-Member, SPIE (International Society for Optical Engineering).
- Ex-Member, International Society for Structural Health Monitoring of Intelligent Infrastructure (ISHMII).

- Ex-Student Member, Adaptive Intelligent Materials & Systems (AIMS) Center, Arizona State University.
- Ex-Student Member, Sensor Signal & Information Processing (SenSIP) Center, Arizona State University.

Academic Research

Arizona State University, Tempe, AZ 2006-2010

- Postdoctoral Scholar (2010):
 - Research in signal processing and statistical modeling in School of Electrical, Computer & Energy Engineering.
- Research Assistant (2006-2010)
 - Research in signal processing and statistical modeling for structural health monitoring in Signal Processing & Adaptive Sensing Laboratory.

San Diego State University, San Diego, CA 2005

- Radar testing and calibration (Fall 2005)
 - Testing of radar and design of process automation using LabView.

Hindustan Aeronautics Limited, Bangalore, India Spring 2005

- Design Engineer intern
 - Intern for design of Engine Test Bed Spectral Analyzer

PROFESSIONAL COURSES

LabView Core 1, 2 and 3, and connectivity 2012

Laser Beam Diagnostics and Process Monitoring: Tools for Competitive Materials Processing 2011

Structural Health Monitoring using Statistical Pattern Recognition 2010

COMPUTER SKILLS

- Programming: Matlab, C/C++, SQL, LabView, Python.
- Database: Oracle, MySQL, MSSQL.
- Applications: Mathematica, L^AT_EX, MS Office, Autocad, Adobe Creative Suite (Photoshop, Illustrator, etc.).
- Web-based: HTML, CSS, PHP.
- Operating systems: Windows, Linux, MacOS.

PROFESSIONAL ACTIVITIES

Reviewer

- IEEE Transactions
- Prognostics and Health Management
- International Conference on Signal Processing and Integrated Networks (SPIN)
- Journal of Intelligent Materials, Systems and Structures (JIMSS)

- Neural Networks Journal
- ICASSP
- SenSIP (IEEE) Workshop

Volunteer

- Lead hands-on workshops during DAPCEP's first STEM Week 2022.
- Cody Rouge community project (multiple years), clean up and photography.
- Mathcounts at GM.
- YES middle school summer 2009 program, organized by ASU
- Sensor & signal processing module for (middle school) Girls Have I.T. Day 2010, organized by ASU
- SenSIP (IEEE) workshop organizing committee 2008
- Women in Science & Engineering (WISE) 2007 in ASU

PATENTS

1. Abhinav Gaur, Kalyanmoy Deb, Debejyo Chakraborty and Jeffrey A. Abell System and Method for Controlling a Machine Using Dimensionally Aware Rule Extraction 16 June 2026 US12656759B2
2. Andrew Clay Bobel, John Patrick Spicer, Debejyo Chakraborty, Ryan Curtis Sekol, Jorge F. Arinez, Jeffrey A. Abell, David C. Gillengerten, Qigui Wang and Mary S. Boyd Pump controller for a sand casting system 16 December 2025 US-12496633-B1
3. Debejyo Chakraborty, Miguel Arturo Saez, John Patrick Spicer, Pei-chung Wang, Spyros P Mellas, Wayne Cai and James M Ward Systems, methods, and apparatuses, of an arc welding (AW) process and quality monitoring 11 June 2024 US-12005532-B2
4. James R. Salvador, Thomas A. Yersak, Debejyo Chakraborty, Charles W. Wampler and Thanh-Son Dao Electrochemical methods for identification of cell quality 3 October 2023 US11774514B2
5. Pei-Chung Wang, Spyros P. Mellas, Debejyo Chakraborty, James Michael Ward and Diana M. Wegner Real-time weld quality analysis systems and methods 25 April 2023 US11633813B2
6. Wayne Cai, Debejyo Chakraborty, Qian Lin, John Moote, Anthony Ottomano and Teresa Rinker Method and Apparatus for Evaluating an Ultrasonic Weld Junction 1 September 2020 10759006B2
7. Wayne Cai, Debejyo Chakraborty, Teresa J. Rinker, Megan E. McGovern, Ryan C. Sekol, Diana M. Wegner and Kevin B. Rober Method and Apparatus for Evaluating a Battery Cell 19 November 2019 US10481215B2
8. Ryan C Sekol, Teresa J Rinker, Debejyo Chakraborty and Jeffrey A Abell Mechanically Conformable Micro-heat Exchangers and Methods for use in Thermal Management of Target Components 29 January 2019 US10190833B2
9. Teresa J. Rinker, Debejyo Chakraborty, Ryan C. Sekol and Jeffrey A. Abell, "Micro Heat Exchangers and Methods for use in Thermal Management of Transportation Vehicle Batteries," 28 May 2019, no. US10305153B2
10. Wayne W. Cai, Debejyo Chakraborty, Qian Lin, John M. Moote, Anthony Ottomano and Teresa J. Rinker, "Method and Apparatus for Evaluating Ultrasonic Weld Junction," 26

- Mar 2019, no. US10241090B2.
11. John Patrick Spicer, Wayne W. Cai, Debejyo Chakraborty and Keith Mink, “Automatic Monitoring of the Alignment and Wear of Vibration Welding Equipment,” 29 Jan 2019, no. US10191471B2 (DE102010050387).
 12. Ryan C. Sekol, Teresa J. Rinker, Debejyo Chakraborty and Jeffrey A. Abell, “Mechanically Conformable Micro-heat Exchangers and Methods for use in Thermal Management of Target Components,” 29 Jan 2019, no. US10190833B2.
 13. Wayne W. Cai, Debejyo Chakraborty, Qian Lin, John M. Moote, Anthony Ottomano and Teresa J. Rinker, “Method and Apparatus for Evaluating an Ultrasonic Weld Junction,” 29 Jan 2019, no. US10189118B2.
 14. Teresa J. Rinker, Debejyo Chakraborty, Ryan C. Sekol and Jeffrey A. Abell, “Micro Heat Exchangers for Controlling Temperature of Workpieces being Joined by Welding,” 24 July 2018, no. US10031499B2.
 15. John Patrick Spicer, Wayne W. Cai, Debejyo Chakraborty and Keith Mink, “Automatic Monitoring of the Alignment and Wear of Vibration Welding Equipment,” 23 May 2017, no. US9658612B2.
 16. John Patrick Spicer, Jeffrey A. Abell, Michael Anthony Wincek, Debejyo Chakraborty, Jennifer Bracey and Hui Wang, Peter W. Tavora and Jeffrey S. Davis, Daniel C. Hutchinson, Ronald L. Reardon and Shawn Utz, “Quality Status Display for a Vibration Welding Process,” 28 March 2017, no. US9604305B2.
 17. John Patrick Spicer, Wayne W. Cai, Debejyo Chakraborty and Keith Mink, “Clamp Force and Alignment Checking Device,” 11 April 2017, no. US9618410B2.
 18. John Patrick Spicer, Debejyo Chakraborty, Michael Anthony Wincek, Hui Wang, Jeffrey A. Abell, Jennifer Bracey and Wayne W. Cai, “Automatic Monitoring of Vibration Welding Equipment,” 22 May 2014, no. US20140138012A1.
 19. Jeffrey A. Abell, John Patrick Spicer, Michael Anthony Wincek, Hui Wang and Debejyo Chakraborty, “Binary Classification of Items of Interest in a Repeatable Process,” 1 May 2013, no. US20130105556A1.

PUBLICATIONS

Journal

1. Carlos A. Escobar, Debejyo Chakraborty, Megan McGovern and Ruben Morales-Menendez, “Quality 4.0 — Green, Black and Master Black Belt Curricula”, *Procedia Manufacturing*, January 2021, 53:748–759.
2. Carlos A. Escobar, Michael A. Wincek, Debejyo Chakraborty and Ruben Morales-Menendez *Process-Monitoring-for-Quality — Applications in Manufacturing Letters Society of Manufacturing Engineers (SME)*, 2018, 16, 14 – 17 doi: <https://doi.org/10.1016/j.mfglet.2018.02.004>
3. Jeffrey A. Abell, Debejyo Chakraborty, Carlos A. Escobar, Kee H. Im, Diana M. Wegner and Michael A. Wincek, “Big Data Driven Manufacturing — Process-Monitoring-for-Quality Philosophy”, *ASME Journal of Manufacturing Science and Engineering (JMSE) on Data Science-Enhanced Manufacturing*, October 2017, 139:10
4. Debejyo Chakraborty, Narayan Kovvali, Antonia Papandreou-Suppappola and Aditi Chat-

topadhyay, “An adaptive learning damage estimation method for structural health monitoring”, in *Journal of Intelligent Material Systems and Structures*, April 2014 doi: 10.1177/1045389X14522531

5. Debejyo Chakraborty, Narayan Kovvali, Jun Wei, Antonia Papandreou-Suppappola, Douglas Cochran and Aditi Chattopadhyay, “Damage Classification Structural Health Monitoring in Bolted Structures Using Time-frequency Techniques”, in *Journal of Intelligent Material Systems and Structures, special issue on Structural Health Monitoring* July 2009 20:11 1289–1305 doi: 10.1177/1045389X08100044

Conference

1. Carlos A. Escobar, Debejyo Chakraborty, Debejyo Chakraborty, Jorge Arinez and Ruben Morales-Menendez, “Augmentation of Body-in-White Dimensional Quality Systems through Artificial Intelligence”, 2021 IEEE International Conference on Big Data (Big Data), December 2021, doi: 10.1109/BigData52589.2021.9671610
2. Claudia V. Goldman, Michael Baltaxe, Debejyo Chakraborty and Jorge Arinez, “Explaining Learning Models in Manufacturing Processes”, International Conference on Industry 4.0 and Smart Manufacturing, January 2021, 180:259–168, doi: 10.1016/j.procs.2021.01.163
3. Debejyo Chakraborty and Megan E. McGovern, “NDE 4.0: Smart NDE”, in *IEEE International Conference on Prognostics and Health Management* June 2019.
4. Portia Banerjee, Debejyo Chakraborty and Teresa Rinker, “Damage Detection Using Time-frequency Decay-rate based Features”, in *IEEE International Conference on Prognostics and Health Management* June 2017
5. Debejyo Chakraborty and Narayan Kovvali, “Generalized Normal Window for Digital Signal Processing”, in *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)* 2013 6083 – 6087 doi: 10.1109/ICASSP.2013.6638833
6. Debejyo Chakraborty and Narayan Kovvali, “A Measure of Difference between Discrete Sample Sets”, in *45th Asilomar Conference on Signals, Systems and Computers* 2011 1908–1912 doi: 10.1109/ACSSC.2011.6190355
7. Debejyo Chakraborty, Narayan Kovvali, Bhavana Chakraborty, Antonia Papandreou-Suppappola and Aditi Chattopadhyay, “Structural Damage Detection with Insufficient Data using Transfer Learning Techniques”, in *Proc. of SPIE, Sensors and Smart Structures Technologies for Civil, Mechanical, and Aerospace Systems* 2011 7981:798147 1 – 9 doi: 10.1117/12.882025
8. Debejyo Chakraborty, Narayan Kovvali, Antonia Papandreou-Suppappola and Aditi Chattopadhyay, “Active Learning Data Selection for Adaptive Online Structural Damage Estimation”, in *Proc. of SPIE, Nondestructive Characterization for Composite Materials, Aerospace Engineering, Civil Infrastructure, and Homeland Security* 2010 7649:764915 1–10 doi: 10.1117/12.848891
9. D. Chakraborty, N. Kovvali, J. Zhang, A. Papandreou-Suppappola and A. Chattopadhyay, “Adaptive Learning for Damage Classification in Structural Health Monitoring”, in *43rd Asilomar Conference on Signals, Systems and Computers* 2009 1678–1682 doi: 10.1109/ACSSC.2009.5469782
10. Lindsey Channels, Debejyo Chakraborty, Brad Butrym, Narayan Kovvali, James Spicer,

- Antonia Papandreou-Suppappola, Mana Afshari, Daniel Inman and Aditi Chattopadhyay, “A Comparative Study of Fatigue Damage Sensing in Aluminum Alloys using Electrical Impedance and Laser Ultrasonic Methods”, in *Proc. of SPIE, Smart Structures and Materials & Non-destructive Evaluation and Health Monitoring 2009* 7295:72950Q 1 – 10 doi: 10.1117/12.815980
11. Debejyo Chakraborty, Wenfan Zhou, Donna Simon, Narayan Kovvali, Antonia Papandreou-Suppappola, Douglas Cochran and Aditi Chattopadhyay, “Time-frequency methods for structural health monitoring” in *SenSIP workshop* May 2008 .
 12. Debejyo Chakraborty, Sunilkumar Soni, Jun Wei, Narayan Kovvali, Antonia Papandreou-Suppappola, Douglas Cochran and Aditi Chattopadhyay, “Physics based modeling for time-frequency damage classification” in *Proc. of SPIE, Modeling, Signal Processing, and Control for Smart Structures* 2008 6926:69260M 1–12 doi: 10.1117/12.776628
 13. Lindsey Channels, Debejyo Chakraborty, Donna Simon, Narayan Kovvali, James Spicer, Antonia Papandreou-Suppappola, Douglas Cochran, Pedro Peralta and Aditi Chattopadhyay, “Ultrasonic sensing and time-frequency analysis for detecting plastic deformation in an aluminum plate”, in *Proc. of SPIE, Modeling, Signal Processing, and Control for Smart Structures* 2008 6926:69260P 1–10 doi: 10.1117/12.776625
 14. W. Zhou, D. Chakraborty, N. Kovvali, A. Papandreou-Suppappola, D. Cochran and A. Chattopadhyay, “Damage Classification for Structural Health Monitoring Using Time-Frequency Feature Extraction and Continuous Hidden Markov Models”, in *Asilomar Conference on Signals, Systems, and Computers* November 2007 848–852 doi: 10.1109/ACSSC.2007.4487337
 15. N. Kovvali, S. Das, D. Chakraborty, D. Cochran, A. Papandreou-Suppapola and A. Chattopadhyay, “Time-Frequency based Classification of Structural Damage” in *48th AIAA/-ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference* April 2007 2047–2055 .
 16. Bhavana Manjunath and Debejyo Chakraborty, “Perimeter security using an acoustic sensor network” in *Research in Interdisciplinary Science and Engineering Symposium - FGSA Annual Student Symposium*, October 2007 .

Dissertation

1. Debejyo Chakraborty, “Time-Frequency Based Adaptive Learning for Structural Health Management”, Arizona State University Tempe, AZ August 2010 .

REFERENCES

Available upon request.