

# Josh Siegel, Ph.D.

## SUMMARY

I am an inventor, academic, and entrepreneur passionate about creating and fostering transformative ideas. I build technologies for a changing world through the application of Deep Technology and help students self-start, disrupt, innovate, and lead within emerging industries.

## CURRENT ROLES

**Assistant Professor**, Computer Science and Engineering January 2019 - Present  
(0% appointment with Electrical and Computer Engineering)  
Michigan State University, East Lansing, MI

**Short-Term Lecturer Appointments**, Open Learning & Sloan School March 2019 - Present  
Massachusetts Institute of Technology, Cambridge, MA

## RESEARCH

I work through the lens of entrepreneurship to develop “Deep Technologies” impossible yesterday, difficult to build today, and with the potential to become invisible and impossible to live without. The DeepTech lab explores connected and automated vehicles, the Internet of Things, pervasive sensing and universal diagnostics, artificially-intelligent cybersecurity and data-driven product design and manufacturing.

*Example projects:*

- Invented a suite of pervasively-sensed diagnostic algorithms improving vehicle efficiency and reliability
- Developed an architecture improving security and efficiency of constrained connected systems
- Led a cross-university team to develop and commercialize an award-winning telematics platform

## TEACHING

Automated Vehicles; Internet of Things; Entrepreneurship; Digital Transformation; Design & Manufacturing.

*Example courses:*

- Created CSE491, SP20: “Entrepreneurship in the IoT”
- Created MSU CSE891/ECE802, FS19: “Advanced Topics in Automated Vehicles”
- Created MIT “DeepTech” and “Internet of Things” Bootcamps
- Created and led additional, intensive programs across age groups (high school to Executive Education)

## EDUCATION

**Doctor of Philosophy**, June 2016  
**Master of Science**, June 2013  
**Bachelor of Science**, June 2011  
Department of Mechanical Engineering, Massachusetts Institute of Technology, Cambridge, MA

## PREVIOUS RESEARCH EXPERIENCE

**Research Scientist**, June 2017 - December 2018  
**Postdoctoral Associate**, June 2016 - May 2017  
**Research Assistant**, June 2011 - May 2016  
**Undergraduate Researcher**, June 2007 - June 2011  
Department of Mechanical Engineering, Massachusetts Institute of Technology, Cambridge, MA

## TEACHING AND MENTORING

**Assistant Professor**, Computer Science and Engineering January 2019 - Present  
Michigan State University, East Lansing, MI

- Created: “Creating Autonomous Vehicles (CSE, ECE, ME),” “Advanced Topics in Automated Vehicles (CSE, ECE),” and “(Entrepreneurship and) the Internet of Things”

**Creator and Lead**, MIT DeepTech and IoT Bootcamps and Private Courses May 2017 - Present  
India; Cambridge, MA; Detroit, MI

- Created MIT Internet of Things and Deep Technology Bootcamps
- Coached Innovation & Entrepreneurship Bootcamp

**Instructor**, YPO Digital Transformation Series “The Digital Transformation Ecosystem” August 2020

**Instructor**, MIT Executive Education “Implementing Industry 4.0” June 2017 - Present

**Creator and Lead**, InkTalks, Cranbrook Kingswood, and corporate programs January 2016-Present

**Creator and Lead**, Hands on PCB Fabrication of Cloud Connected Devices January 2016

**Teaching Assistant**, 2.008, Design and Manufacturing II (MIT) Fall 2012

**Teaching Assistant**, SEM.089/095, Tech Start-Ups I & II (MIT) Fall '10-'16

## PROFESSIONAL EXPERIENCE

**Founder & Consultant**, DataDriven Diagnostics LLC, Novi, MI May 2020 - Present  
DataDriven Diagnostics offers technical and management consulting services.

- Serving clients seeking Digital Transformation roadmapping + oversight
- Technology expert (witness), speaker, and editorial content consultant

**Founder & CTO**, CarKnow LLC d.b.a. DataDriven, Brookline, MA December 2016 - February 2019  
DataDriven uses mobile devices’ built-in sensors to proactively detect and respond to vehicle faults.

- 2017 Global Automotive and Mobility Innovation Challenge finalist; 2016&17 MIT 100K semi-finalist; Telematics Update “Best Aftermarket Telematics Product or Service” shortlist; 2016 MassChallenge Round 2 Judging qualifier

**Founder, CEO & CTO**, CarKnow LLC, Brookline, MA June 2011 - December 2016  
CarKnow built a universal automotive connectivity platform (hardware+software+API).

- Winner, 2014 MassChallenge MassIT Government Innovation Prize
- Press mention in AOL Media’s “*Translogic*,” *The New York Times*, and *AutoBlog*

**Consultant**, Self Employed, Brookline, MA June 2011 - 2013

- Designed hardware for mobile energy audit platform (used on 1M+ homes)
- Designed automotive data collection system for the University of North Texas

**Technical Advisor & Developer**, AutoMob [MySuzy], Cambridge, MA September 2010 - June 2012

- Commercialized undergraduate research as “context layer” for motion-based app reconfiguration

**Co-Founder & President**, Course Zero Automation, Boston, MA March 2008 - January 2011

- Developed “Boeing Prize” winning inertial navigation unit (later licensed)

## SELECTED AWARDS

- Cyprus Education Leaders Gold (2020) and Best Learning Experience (2019) Awards
- **2020 IEEE Sensors Best Paper**
- **2018 ICAT-EGVE Best Demo**
- **2018 SCF Artificial Intelligence and Mobile Services (AIMS) Best Paper**
- **2015 \$15,000 Lemelson-MIT National Collegiate Student “Drive It” Prize**
- 2015 Hero of the Year in the Cloud Innovation World Cup
- 2015 Telematics Update 2015 “Industry Newcomer” Award Finalist
- 2015 Global Automotive Innovation Challenge Finalist
- **2014 BMW-EURECOM “Highly Autonomous Driving in the IoT” Best Ideation Award**
- **2014 \$25,000 MassIT Government Innovation Competition Winner**
- 2014 BMW-EURECOM “Highly Autonomous Driving in the IoT” Outstanding Research Travel Grant
- 2014 IPSO Alliance Challenge SemiFinalist (mentored by Presidential Innovation Fellow)
- 2014 MassChallenge Finalist
- 2014/15 IoT/M2M Hero of the Year in the Innovation World Cup
- 2014/15 Innovation World Cup - Finalist, Mobility Solutions & GEO Award
- 2014, 2017 Top 100 (out of 900) - NASA Tech Briefs “Create the Future” Competition
- 2011 3rd Place Award MIT deFlorez Mechanical Engineering Competition (CloudCar System)
- **2008 MIT/ISN Soldier Design Competition Boeing Prize**
- McCaul Endowment Grant for autonomous vehicle development
- 1st in 2007 University of Michigan, State of Michigan High School Programming Contest
- Cranbrook Kingswood High School Prize Programming Awards ('10, '11)
- Cranbrook Kingswood Studio Art Award (Sculpture), Excellence In Art Award (Prints)
- Cranbrook Kingswood Caltech Book Award & Strickland Writing Scholar Award

## PATENTS

1. J. Siegel, R. Bhattacharyya. “Applying Motion Sensor Data To Wheel Imbalance Detection, Tire Pressure Monitoring, And/Or Tread Depth Measurement.” US20180003593A1. 2020.
2. J. Siegel, S. Sarma “Systems and Methods for Managing Data Proxies.” US10,637,951. 2020.
3. C. Jacoby, J. Jurewicz., J. Siegel, A. Winter, Y.S. Jo, G. Panames, D. Dorsch. Clutchless Shifting of a Manual Transmission.” US10,315,659. 2019.
4. D. Erb, I. Ehrenberg, P. Jain, J. Siegel. “Systems, Devices and Methods for Three-Dimensional Printing.” US10052824B2. 2018.
5. J. Siegel “System and Method for Providing Predictive Software Upgrades.” US9,086,941. 2015.
6. S. Sarma, J. Siegel, S. Ho. “System and Method for Providing Road Condition and Congestion Monitoring Using Smart Messages.” US8,566,010. 2013.
7. [Pending] J. Siegel, S. Kumar, I. Ehrenberg. “System, Device, and Method for Feature Generation, Selection, and Classification for Audio Detection of Anomalous Engine Operation.” US20180005463A1. 2016
8. [Pending] S. Sarma, R. Bhattacharyya, J. Siegel, S.N. Reddy Kantareddy., A. Armengol Urpi, P. Sen. “System and Method for Wireless Sensing of Health Monitoring.” US20200078228A1. 2018.
9. 5+ Provisional Applications for Patent and 10+ IP Disclosures

## SELECTED PUBLICATIONS (of 50+, h-index=11)

\* denotes equal contribution, † denotes authors under my (co)supervision.

### Peer-Reviewed Journal Articles

1. J. Siegel and S. Krishnan. “Cultivating Invisible Impact with Deep Technology and Creative Destruction,” to appear. *Journal of Innovation Management* 8(3). 2020.
2. G. Falco\*, J. Siegel\*. “A Distributed ‘Black Box’ Audit Trail Design Specification for Connected and Automated Vehicle Data and Software Assurance,” to appear. *SAE International Journal of Transportation Cybersecurity and Privacy*. 2020.
3. J. Siegel, K. Yang. “Deep Quality: A Revolution In Needs-Meeting and Designing to Real Value,” to appear. *Quality Progress*.
4. D. Suo†, J. Siegel, A. Soley. “Driving Data Dissemination: The “Terms” Governing Connected Car Information,” to appear. *IEEE Intelligent Transportation Systems Magazine*.
5. D. Kent†, B. Cheng, J. Siegel. “Assuring Vehicle Update Integrity using Asymmetric Public Key Infrastructure (PKI) and Public Key Cryptography (PKC).” *SAE International Journal of Transportation Cybersecurity and Privacy*, 2(2). 2020
6. J. Siegel, M. Beemer, S. Shepard. ”Automated non-destructive inspection of Fused Filament Fabrication components using Thermographic Signal Reconstruction.” *Additive Manufacturing* 31 (January), 100923. 2020.
7. J. Siegel, A. Das, Y. Sun and S. Pratt. “Safe Energy Savings Through Context-Aware Hot Water Demand Prediction.” *Elsevier Engineering Applications of Artificial Intelligence* 90 (April), 103481. 2020.
8. P. Sen†, S.N. Kantareddy, R. Bhattacharyya, S. Sarma and J. Siegel. “Low-cost diaper wetness detection using disposable RFID tags and in-situ hydrogel sensing.” *IEEE Sensors* 20 (6), pp. 3293-3302. 2019. **IEEE Sensors Best Paper (2020)**.
9. J. Siegel, S. Sarma. “Using Open Channels to Trigger IoT’s Invited, Unintended Consequences.” *IEEE Security & Privacy* 17 (3), pp. 49-55. 2019.
10. J. Siegel, S. Sarma. “A Cognitive Protection System for the Internet of Things.” *IEEE Security & Privacy*, 17 (3), pp. 40-48. 2019.
11. J. Siegel. “Cognitive Protection Systems for the Internet of Things.” *Homeland Defense and Security Information Analysis Center Journal* 5 (4), pp. 16-20. 2019.
12. A. Soley\*†, J. Siegel\*, D. Suo, S. Sarma. “The Value in Vehicles: An Economic Assessment of Automotive Data.” *Digital Policy, Regulation and Governance* 20 (6), pp. 513-527. 2018.
13. J. Siegel, S. Pratt, YB. Sun, S. Sarma. “Implementing Real-Time Deep Neural Networks For Internet-Enabled Arc-Fault Detection.” *Engineering Applications of Artificial Intelligence* 74 (September), pp. 35-42. 2018. **Featured on MIT’s Homepage, 6/15/18**.
14. J. Siegel, S. Kumar, S. Sarma, “The Future Internet of Things: Secure, Efficient, and Model-Based.” *IEEE Internet of Things Journal* 5 (4), pp. 2386-2398. 2018.
15. D. Suo, J. Siegel, S. Sarma. “Merging Cybersecurity and Safety in Product Design.” *IET Intelligent Transportation Systems* 12 (9), pp. 1103-1109. 2018.
16. J. Siegel, R. Bhattacharyya, S. Kumar, S. Sarma, “Air Filter Particulate Loading Detection using Smartphone Audio and Optimized Ensemble Classification.” *Engineering Applications of Artificial Intelligence* 66 (November), pp. 104-112. 2017. **Featured on MIT’s Homepage, 10/26/17**.
17. J. Siegel, D. Erb, S. Sarma, “A Survey of the Connected Vehicle Landscape – Architecture, Enabling Technologies, Applications, and Development Areas.” *IEEE Transactions on Intelligent Transportation Systems Journal* 19 (8), pp. 2391-2406. 2018.
18. J. Siegel, D. Erb, S. Sarma, “Algorithms and Architectures: A Case Study in When, Where and How to Connect Vehicles.” *IEEE Transactions on Intelligent Transportation Systems Magazine* 10 (1), pp. 74-87. 2018.
19. J. Siegel, D. Erb, I. Ehrenberg, P. Jain, S. Sarma, “Local Viscosity Control Printing for High Throughput Additive Manufacturing of Polymers.” *3D Printing and Additive Manufacturing* 3 (4), pp. 252-261. 2016.

20. I. Ehrenberg, J. Siegel and D. Erb. “The tallest column: On monetary value of Stature in Jewish Law.” *Hakirah* 25, pp. 161-173. 2018.
21. E. Wilhelm, J. Siegel, S. Mayer, L. Sadamori, S. Dsouza, C. Chau, S. Sarma. “CloudThink: A Scalable Secure Platform for Mirroring Transportation Systems in the Cloud” *Transport* 30 (3), pp. 320-329. 2015.

*Peer-Reviewed Conference Articles*

1. G. Pappas<sup>†</sup>, V. Karaiskou, J. Siegel, K. Politopoulos, and C. Christodoulides “Virtual Art Viewing for Education and Learning (VAVEL): A tool for automatic Virtual Art Space creation for students and artists,” accepted to RISE IMET 2021.
2. G. Pappas<sup>†</sup>, S. Stavrou, A. Peratikou, J. Siegel, K. Politopoulos, C. Christodoulides. “Cyber Escape Room: An Educational 3D Escape Room Game Within A Cyber Range Training Realm.” *INTEAD2020 Proceedings*, pp. 2621-2627. 2020. **“Gold Award,” Cyprus Education Leaders Award, 2020.**
3. T. Mustapaa, J. Autiosalo<sup>†</sup>, P. Nikander, J. Siegel, R. Viitala. “Digital Metrology for the Internet of Things.” *Proceedings of the 2020 Global Internet of Things Summit (GIoTS)*, pp. 1-6. 2020.
4. Y. Sun, Y. Wang, Z. Liu, J. Siegel, and S. Sarma. “PointGrowNet: Autoregressively Learned Point Cloud Generation with Self-Attention.” *IEEE Winter Conference on Applications of Computer Vision*, pp. 61-70. 2020.
5. Y. Sun, S.N. Kantareddy, J. Siegel, A. Armengol-Urpi, X. Wu, H. Wang and S. Sarma. “Towards Industrial IoT-AR Systems using DeepLearning-Based Object Pose Estimation.” *International Performance Computing and Communications Conference* 2019.
6. Y. Sun, A. Armengol-Urpi, S.N. Kantareddy, J. Siegel, S. Sarma. “MagicHand: A Deep Learning Approach towards Manipulating IoT Devices in Augmented Reality Environment.” In *Proceedings of 2019 IEEE Conference on Virtual Reality and 3D User Interfaces*.
7. R. Strzebkowski, T. Gehrman, J. Siegel, K. Politopoulos, Christodoulides, C. and Pappas, G. “AR/VR/Game-based Edutainment Applications and Real-Time Data Visualisation Technologies for Discovery Learning in the Industry and Distance Education.” In *Proceedings of OEB Conference, December 2018. “Best Learning Experience” at 2019 Cyprus Education Leaders Awards.*
8. G. Pappas<sup>†</sup>, J. Siegel and K. Politopoulos. “VirtualCar: Virtual Mirroring of IoT-Enabled Avacars in AR, VR and Desktop Applications.” *ICAT-EGVE 2018. Best Demonstration*
9. J. Siegel, YB. Sun and S. Sarma. “Automotive Diagnostics as a Service: An Artificially Intelligent Mobile Application for Tire Condition Assessment.” *Services Society Artificial Intelligence and Mobile Services (AIMS) Industry and Applications Track. In Lecture Notes in Computer Science, 2018. Best Paper.*
10. D. Suo, J. Siegel, S. Sarma. “TIRCPS: Merging Cybersecurity and Safety in Product Design.” *ITS World Congress. September 2018.*
11. BT. Kumaravel, R. Bhattacharyya, J. Siegel, S. Sarma, N. Arunachalam. “Development of an Internet of Things enabled Manufacturing system for tool wear characterization.” *Proceedings of the 2017 IEEE International Symposium on Robotics and Manufacturing Automation. 2017.*
12. J. Siegel, S. Kumar, I. Ehrenberg, S. Sarma, “Engine Misfire Detection With Pervasive Mobile Audio,” *European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases 2016. In Lecture Notes in Computer Science, 2016.*
13. J. Siegel, R. Bhattacharyya, A. Deshpande, S. Sarma. “Smartphone-Based Vehicular Tire Pressure and Condition Monitoring.” *Proceedings of SAI Intelligent Systems 2016.*
14. J. Siegel, R. Bhattacharyya, A. Deshpande, S. Sarma. “Smartphone-Based Wheel Imbalance Detection.” *Proceedings of Dynamic Systems and Controls Conference 2015.*
15. S. Mayer and J. Siegel. “Conversations with Connected Vehicles.” *Proceedings of IoT 2015.*
16. J. Siegel, R. Bhattacharyya, A. Deshpande, S. Sarma. “Vehicular Engine Oil Service Life Characterization Using On-Board Diagnostic (OBD) Sensor Data.” *Proceedings of IEEE Sensors 2014. Paper invited for submission into Special Issue Journal.*
17. J. Jurewicz, G. Pamanes, Y. Suk Jo, P. Yen, J. Siegel, C. Jacoby, D. Dorsch, A. Winter. “Design Of A Clutch-Less Hybrid Transmission For A High-Performance Vehicle.” *Proceedings of 2015 ASME International Design Engineering Technical Conferences & Computers and Information in Engineering*

Conference.

#### *Book Chapters*

1. J. Siegel, S. Kumar, “Cloud, Context, and Cognition: Paving the Way for Efficient and Secure IoT Implementations” to appear in “Handbook on Integration of Cloud Computing, Cyber Physical Systems and Internet of Things”, 2021.
2. J. Siegel, V. Palusci. “Technological Advances in Child Abuse Prevention,” in “Preventing Child Abuse: Critical roles and multiple perspectives,” 2020.
3. J. Siegel, D. Morris. “Robotics, Automation, and the Future of Sports,” in “Sports and Technology,” pp. 55-73. 2020.

#### *Submitted Manuscripts and Pre-Prints*

1. J. Siegel\*, G. Pappas\*<sup>†</sup>. “The Role for Morals and Ethics in Automated and Self-Driving Vehicles.” Under review in Elsevier Journal of Science and Engineering Ethics.
2. J. Barnett<sup>†</sup>, N. Gizinski<sup>†</sup>, E. Mondragon-Parra<sup>†</sup>, J. Siegel, D. Morris, T. Gates, E. Kassens-Noor, P. Savolainen. “Sharing the Road: Improving Automated Vehicle Compliance with Pedalcyclist Passing Laws.” Under review in IEEE Transactions on Intelligent Vehicles.
3. E. Kassens-Noor, Z. Neal, J. Siegel and T. Decaminada. “Choosing Morals over Ethics: a Possible Determinant to Embracing Autonomous Vehicles?” Under review in TRB Annual Meeting.
4. J. Siegel\*, G. Pappas\*<sup>†</sup>, K. Politopoulos and Y. Sun<sup>†</sup>. “A Gamified Simulator and Physical Platform for Self-Driving Algorithm Training and Validation.” Under review in IEEE Transactions on Games.
5. J. Siegel, U. Coda<sup>†</sup>. “Surveying Off-Board and Extra-Vehicular Monitoring and Progress Towards Pervasive Diagnostics.” Under review in IEEE Transactions on Intelligent Transportation Systems.
6. P. Gupta\*<sup>†</sup>, D. Coleman\*<sup>†</sup>, J. Siegel. “Towards Safer Self-Driving Through Great PAIN (Physically Adversarial Intelligent Networks).” arXiv Preprint, 2020.

#### *Theses*

1. Siegel, Joshua. “Data Proxies, the Cognitive Layer, and Application Locality: Enablers of Cloud-Connected Vehicles and Next-Generation Internet of Things” Ph.D. Dissertation. Massachusetts Institute of Technology, 2016
2. Siegel, Joshua. “CloudThink and the Avacar: embedded design to create virtual vehicles for cloud-based informatics, telematics, and infotainment” S.M. Thesis. Massachusetts Institute of Technology, 2013
3. Siegel, Joshua. “Design, Development, and Validation of a Remotely Reconfigurable Vehicle Telemetry System for Consumer and Government Applications,” S.B. Thesis. Massachusetts Institute of Technology, 2011

#### *Technical and White Papers*

1. J. Siegel, S. Krishnan, B. Subirana, S. Sarma., J. Merritt, L. Joseph, R. Arias. “Realizing the Internet of Things: A Framework for Collective Action.” **World Economic Forum Davos, January 2019.**
2. E. Wilhelm, J. Siegel, S. Mayer, J. Paefgen, M. Tiefenbeck, M. Bicker, S. Ho, R. Dantu, S. Sarma. CloudThink: An Open Standard for Projecting Objects into the Cloud
3. J. Siegel. Internet of Things Trends, World Economic Forum Transformation Map. November 2017; updated January 2019.
4. S. Sarma and J. Siegel. “Industrial Intelligence: AI’s Implications on Security, Seamlessness and Services for the IIoT.” Industrial Internet Consortium Journal of Innovation. November, 2017.
5. J. Siegel. “Neural Network-Enabled Arc-Fault Detection for Critical Infrastructure Supervision.” **Spotlight**, Homeland Defense and Security Information Analysis Center. August 2018.
6. Contributor - [World Economic Forum] - Accelerating the Impact of IoT Technologies

#### *Popular Media*

1. [Wall Street Journal] A Classic Chevy Fit for a Hometown Parade - **Cross-Posted to MIT Homepage, 8/19/2018**
2. “Bad (Internet of) Things.” Computerworld, 30 November, 2016.
3. “Imagining The ‘Connected’ Car of the Future.” PRI’s “Science Friday.” 30 September, 2016.

4. "Smartphone Mechanic." BYU Radio's "Top of Mind with Julie Rose." December 13, 2017
5. "S2E05." The "Internet of Things Podcast." February 2018.
6. "Lansing Stunts the Automotive Revolution." The Detroit News, Editorial Section. 5 May, 2016.
7. "CarKnow's Car Hacking." AOL Translogic. Episode 135.

#### SELECTED INVITED TALKS

1. "Connectivity and the Internet of Things in Industry." AIChE Seminar. (Digital, 11/2020)
2. "Artificial Intelligence and Machine Learning in Manufacturing." PSU ICDS. (Digital Panel, 10/2020)
3. "How to Write a Research Paper." MSU Graduate Lunch and Learn Seminar. (Digital, 10/2020)
4. "DeepTech and the Digital Transformation Ecosystem." YPO Executive Education. (Digital, 8/2020)
5. "Deep Technology." CampusParty 2020. (Digital, 7/2020)
6. ~~"Keynote." Robofest. Cancelled due to COVID-19.~~ (Pachuca, Mexico, 4/2020)
7. "V2V and Automotive Cybersecurity." MSU CSE/ECE491 Guest Lecture. (East Lansing, MI, 3/2020)
8. "Kickoff." MIT-Lemelson & MSUK-12 Mid-Grant Review (East Lansing, MI, 2/2020)
9. "The IoT, Connected Vehicles, and Localization." SureThing Workshop (Lisbon, Portugal, 1/2020)
10. Defining Deep Technology. 2019 (International Webinar)
11. Making Connectivity Commonplace - Michigan State University (Lansing, MI). 2018.
12. Making Connectivity Commonplace - Wayne State (Detroit, MI). 2018.
13. IoT as a Design Tool - MIT Ideation Lab (Cambridge, MA). 2018.
14. Context and Cognition for Secure and Efficient IoT - UWash Summer Institute (Snoqualmie, WA, 2017)
15. UBS Investor Meeting - Connected Vehicles, Autonomy, and Mobility Services (Cambridge, MA)
16. **[Keynote]** Killer Apps for the IoT - MIT Startup Exchange Conference, (Cambridge, MA)
17. DataDriven - The Machine Learning Mechanic - SAE World Congress, (Detroit, MI, USA)
18. UBS Investor Meeting - Connecting Vehicles (Cambridge, MA)
19. Cloud and Cognition for Cost and Efficiency Improvements - IoT Meetup, (International Webinar)
20. IoT's Role in Industry - Disruptive Angels "Hacking Innovation" Conference, (International Webinar)
21. Data Proxies and Cognition in Industry - MIT ILP R&D Conference, (Cambridge, MA)
22. The IoT for Energy Applications - Lincoln Labs Seminar 2016, (Lincoln, MA)
23. Field Intelligence Lab - MIT Office for Digital Learning Lunch Series, (Cambridge, MA)
24. Cloud, Context, and Cognition - Viakable Forum on Technology and Innovation 2016 (Monterrey, MX)
25. Low-cost, pervasive sensing leveraging existing wireless infrastructure - IoT 2015 (Seoul, Korea)
26. Engineering Connectivity: Hot-Rodding in the Digital Era - EurekaFest 2015 (Cambridge, MA, USA)
27. CarKnow - NextEnergy GAIC at SAE World Congress (Detroit, MI, USA)
28. Unlocking Open Data Standards - IoT 2014 (Cambridge, MA, USA)
29. CarKnow and the Virtual Vehicle - t=0 Hardware Night 2014 (Cambridge, MA, USA)
30. CarKnow - University Research and Entrepreneurship Symposium 2013 (Cambridge, MA, USA)
31. Cloudy with a Chance of Big Data - IoT Meetup Kickoff Presentation 2013 (Cambridge, MA, USA)
32. CloudCar - Verizon 4G Venture Forum 2013 (San Francisco, CA, USA)
33. Presenter with MIT Industrial Liaison Program (50+ companies and 50+ occasions)
34. Presenter with MIT Entrepreneurs Club, MassChallenge, Global Automotive and Mobility Challenge

#### CONFERENCE PRESENTATIONS AND POSTERS

1. J. Siegel. "Cracking the code on automotive tire faults." AI and Mobile Services, 2018. Seattle, WA. **Best Paper.**
2. J. Siegel. "Making Things Think: How context and cognition secure and supervise the IoT" New Directions in Software Technology 2017. Maui, HI
3. J. Siegel, S. Kumar, I. Ehrenberg and S. Sarma. "Automotive Engine Misfire Detection Using Smartphone Audio." European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases 2016. Riva del Garda, Italy.
4. J. Siegel, R. Bhattacharyya, A. Deshpande and S. Sarma. "Smartphone-Based Vehicular Tire Pressure and Condition Monitoring." SAI Intelligent Systems 2016. London, England.
5. S. Mayer and J. Siegel. "Conversations with Connected Cars." IoT 2015. Seoul, Korea.

6. J. Siegel, R. Bhattacharyya, A. Deshpande, S. Sarma. “Vehicular Engine Oil Service Life Characterization Using On-Board Diagnostic (OBD) Sensor Data.” IEEE Sensors 2014. Valencia, Spain.
7. J. Siegel. “CloudThink: Using ‘Avacars’ to Solve the Vehicle Data Access Problem” — BMW/EURECOM Summer School, “Highly Autonomous Driving in the Internet of Things,” Tegernsee, Germany.
8. J. Siegel. “CarKnow: Avacars Enabling Virtual Vehicles.” SENSORS Expo 2014. Rosemont, IL, USA.
9. D. Erb, J. Siegel, I. Ehrenberg, P. Jain. “Local Viscosity Control Printing.” MIT deFlorez Competition 2015. Cambridge, MA, USA.
10. J. Siegel. “CARduino and CloudThink.” MIT deFlorez Competition 2013. Cambridge, MA, USA.
11. J. Siegel. “Remotely Reconfigurable Vehicle Telemetry System and Supporting Applications.” MIT deFlorez Competition 2011. Cambridge, MA, USA.
12. J. Siegel. “Wearable Non-Contact AC Voltage Detector.” MIT deFlorez Competition 2010. Cambridge, MA, USA.

### INVITED CONFERENCES

1. [Ideator] 2018 US SOCOM “Innovation Foundry 2.0”
2. [Invited Guest] 2017 & 2018 Detroit Homecoming

### STUDENTS

At MIT, Josh directly advised over one dozen visiting, undergraduate, Master’s, and Ph.D. students.

- |   |  |   |
|---|--|---|
| 1. [Ph.D.] Yongbin Sun<br><i>Computer Vision</i>  | 5. [Affiliate] Alex Soley<br><i>Social Impact of AVs</i> | 9. [S.B.] Hassan Kane   |
| 2. [Ph.D.] Dajiang Suo<br><i>Cybersecurity</i>    | 6. [S.B.] Elizabeth Pedlow<br><i>Robotic Platforms</i>   | 10. [S.B.] Alex Nachlas   |
| 3. [S.M.] Pankhuri Sen<br><i>Low-cost Sensing</i> | 7. [S.B.] Aaron Rose                                     | 11. [Visiting] Bala Thoravi Kumaravel<br><i>IoT Manufacturing</i> |
| 4. [Staff] Shane Pratt                            | 8. [S.B.] Doug Coughran                                  | 12. [Visiting] Pranav Sharan<br><i>Computer Vision</i>            |

At MSU, Josh is advising or has advised:

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|--|--|--|
| 1. [B.S.] Aniruddha Das [MIT + Georgia Tech]<br><i>Embedded Intelligence</i> | 6. [B.S./Intern] Josué Kpodo [MSU, Moddable]<br><i>Metadata Standards for IoT</i>  | 11. [Ph.D.] Adam Terwilliger<br><i>Computer Vision</i>                                 |
| 2. [B.S.] Owen Evey<br><i>Computer Vision</i>                                | 7. [M.S.] Umberto Coda [Politecnico di Torino]<br><i>Vibroacoustic Diagnostics</i> | 12. [Ph.D.] Juuso Autiosalo [Aalto University ME]<br><i>Digital Twins</i>              |
| 3. [B.S.] Jacob Rutkowski<br><i>Games as Tools</i>                           | 8. [M.S.] Dave Ackley<br><i>Cybersecurity</i>                                      | 13. [Ph.D.] Georgios Pappas [ECE, MSU + NTUA + MIT Bootcamps]<br><i>Games as Tools</i> |
| 4. [B.S.] Aidan Erickson<br><i>Cybersecurity</i>                             | 9. [Ph.D.] Harrison Fernandez<br><i>Cybersecurity</i>                              |  |
| 5. [B.S.] Matthew Rhodes<br><i>Pervasive Intelligence</i>                    | 10. [Ph.D.] Karthik Karur [ECE]  |  |



## FUNDING AND GRANTS

Josh previously managed a Ford-MIT Project and directly secured and managed over \$1.5M in government grants and corporate contracts. These projects were sponsored by Ford, CMPC, Jaguar Land Rover, DOT-Volpe, NSF, and the Oregon DOT. NVIDIA provided support with two GPU Grants (Titan Xp GPUs).

At MSU, Josh is Co-PI of the Elektrobot Virtual Laboratory (funding from the Elektrobot company for automotive and related teaching and research).

## PROFESSIONAL MEMBERSHIPS

IEEE, SAE

## LEADERSHIP AND ACTIVITIES

*Treasurer ('08-'11, '13-'15) & President ('10-'14)*, MIT Entrepreneurs Club February 2008 - December 2018

- Host weekly meetings with entrepreneurs, provide feedback, organize events to inspire students
- Organize outreach and recruitment, including activity fairs and MIT ESP programming
- Helped organize industry-affiliated Hackathon at MIT

*Co-President ('08-'09)*, MIT Electric Vehicle Team October 2007 - August 2009

- Researched rapid recharge technology and converted 1976 Porsche 914 to electric drive
- Regular presenter at MIT Energy Club events

*Team Captain ('08-'10) & Mentor ('10-'12)*, ISN Soldier Design Competition November 2007 - June 2012

- Developed solutions to meet urgent soldier needs, including hardware, electronics, and software
- Created MEMS inertial navigation system for soldier use in GPS-deprived environments

*Entrepreneurship Lead ('09-'11) & SteerCo ('10-'11)*, MIT Hibur Delegation November 2009 - March 2011

- Member of student-led delegation to the Technion, focusing on entrepreneurship and EV research
- Worked with Technion students to set up internship and research partnerships

*House, Parking & Risk Manager, SteerCo*, MIT Alpha Epsilon Pi December 2007 - June 2011

- Maintained two houses, coordinated major renovations
- Volunteer work & philanthropy: organize food drives, charity events, run Gift of Life registry
- Teach with other members in MIT's "Splash" program, run by MIT Educational Studies Program

## RECENT SERVICE

*Co-Author & Curator*, World Economic Forum March 2017-Present

- Co-author of IoT white paper shared at 2019 Davos and WEF summits
- Contributor, World Economic Forum. Accelerating the Impact of IoT Technologies
- Develop content for "Transformation Map" on the Internet of Things

*Screening Committee Member*, Lemelson-MIT Student Prize & InvenTeams 2016-Present

- Review applications for Lemelson-MIT National Student Prize and InvenTeams

*Mentor*, MSU Honors College Professorial Assistantship Program August 2020-Present

*Committee Member*, MSU CSE Curriculum Committee February 2019-Present

*Faculty Co-Lead*, MSU AutoDrive Challenge Student Team August 2019-Present

*Student Advisor/Mentor*, MSU EnSURE Program April 2019-August 2019

*Program Committee*, HyperAgents Workshop, The WebConf 2019 October 2018-2019

*Review Panelist*, National Science Foundation 2019-Present

*Judge*, Robofest (Lawrence Technological University) 2019-Present

*Invited Expert*, ECMA TC53 (drafting sensor metadata provenance specification) 2018-Present

*Reviewer*, Ontario Ministry of Agriculture, Food and Rural Affairs research proposals 2018-2019

*Organizer*, MSU CSE New Faculty Meetings 2019

*Representative*, Cranbrook Regional Alumni Network (New England) October 2017-December 2018

*Scientific Committee*, IEEE Conference on IoT for the Global Community January 2017-July 2017

*Technical Program Committee*, Electric Vehicle Systems, ACM eEnergy 2016 December 2015-May 2016

*Reviewer*

- **IEEE** Transactions on Intelligent Transportation Systems, Intelligent Transportation Systems Magazine, Internet of Things Journal
- **Elsevier** Engineering Applications of Artificial Intelligence
- **Springer Nature** Applied Science
- **Taylor & Francis** Journal of Urban Affairs
- **Wiley** Engineering Reports
- **MDPI** IoT, Sensors, Sustainability, Applied Sciences

Other service:

1. 2020-Present - Consulting for the CEO (Large Private Company)
2. 2019-Present - Consulting for the Board (Large Public Company)
3. 2018-Present - Homeland Defense And Security Information Analysis Center - Subject Matter Expert
4. 2018-Present - GLG Consulting - Council Member
5. 2018 - Expert Witness - IoT Litigation
6. 2018 - Red Line Editorial - Technical Content Editor for The Internet of Things: Tech Bytes
7. 2018 - CyberReason - Expert Interviewee for “The Defenders” Movie
8. 2018 - MIT/Emeritus Entrepreneurship Bootcamp - Judge & Panelist
9. 2017/8 - UBS Investments - Industry Expert
10. 2017 - Cranbrook-Kingswood “Detroit Ex-Pat” Alumni Panel - Panelist
11. 2017 - MIT ILP “Killer Apps in the IoT” - Panelist

**ABBREVIATED MEDIA COVERAGE**

1. [MIT News] Low-cost “smart” diaper can notify caregiver when it’s wet - **MIT Homepage, 2/14/2020**
2. [Boston Globe] New disposable smart diaper sends phone a message when a change is needed]
3. [The Verge] RFID sensor is powered by dirty diapers]
4. [The New York Times] Short-Term Programs for Long-Term Success]
5. [MIT News] MIT engineers build smart power outlet - **MIT Homepage, 6/18/2018**
6. [MIT News] Revolutionizing everyday products with artificial intelligence]
7. [VentureBeat] MIT researchers develop a smart power outlet
8. [DigitalTrends] MIT engineers a smarter, safer power outlet (for IoT, of course)
9. [MIT News] New Software Lets your Car Tell you What it Needs - **MIT Homepage, 10/26/2017**
10. [Digital Trends] MIT app listens to a car to diagnose problems before symptoms are apparent

11. [ArsTechnica] A phone app that listens to your car and could warn of impending trouble
12. [Smithsonian] This App Can Diagnose Your Car Trouble
13. [Technology Review] A Stethoscope for Cars - January/February 2018 Issue
14. [Geek.com] MIT App Turns Anyone Into the Car Whisperer
15. [Yahoo Finance] Smartphones could diagnose car maintenance needs ahead of problems by listening
16. [ThomasNet] MIT App Listens for a Car's Plea for Maintenance
17. [Highways Today] Cars, Trucks and Construction Equipment will soon tell you what they need
18. [PRI] Cars in the Cloud
19. [Science Friday] Imagining the "Connected" Car of the Future
20. [AAAS Science Update] Car Noise App
21. [WIRED] The Internet of Anything: The Little Box That Hooks Your Old Car Up to the Internet
22. [Translogic] TRANSLOGIC 135: CarKnow Car Hacking
23. [AutoBlog] In Detail: CarKnow Car Hacking
24. [AutoBlog] How to hack a Buick Regal with CarKnow
25. [Mass High Tech] MIT spawns tech that succeeds when GPS fails
26. [Mass.Gov Blog] Astra IDentity and CarKnow the first MassIT Government Innovation Prize
27. [MIT News] Lemelson-MIT announces 2015 National Collegiate Student Prize Competition winners
28. [Discovery News] College Inventors Awarded for Leading the Future of Tech
29. [MIT News] Tomorrow's soldier: powered, spring-loaded and located
30. [MIT News] MIT student ingenuity plus high-tech batteries yields advanced all-electric Porsche
31. [MIT News] Outside the classroom, students create future businesses

### HOBBIES AND INTERESTS

- Car hacking
- Auto restoration
- Electric vehicles
- DIY CNC Tools