

Curriculum Vitae

Harshvir Singh, B.Eng., M.Eng., P.Eng.

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PRACTICE AREAS

- **Electrical Failure**
- **Collision Reconstruction**
- **Autonomous Vehicle Collisions**
- **Fire Investigation**
- **Product Failure**
- **Video Analysis**
- **Motorcycle Collisions**
- **Pedestrian and Bicycle Collisions**
- **Social Media Investigation**
- **Computer Simulation & Animation**

ACADEMIC BACKGROUND

Master of Engineering, Electrical & Computer Engineering, Queen's University, Kingston 2019

- Graduate-level courses in Power Electronics, Modelling and Control of Power Converters, Emerging Technologies in Power Grid, Electric Machines and Control
- Research project: On-skin wearables for smart devices interface

Bachelor of Engineering, Electrical Engineering, Thapar University, India, 2018

- Undergraduate level courses in Power System Analysis and Stability, Optimization and Control of Power Systems, Switchgear and Protection, FACTS, Power Generation, Transmission and Distribution, Power Electronics, Control Systems, Electric Drives, AC Machines, DC Machines, and Transformers

EMPLOYMENT HISTORY

Advantage Forensics Inc., Toronto

Senior Forensic Engineer, January 2020 to present

- Electrical team lead investigator
- Member of Collision Reconstruction, Fire Investigation, and Product Failure Teams

Department of Electrical & Computer Engineering, Queen's University

Research Assistant, Nano Lab, March 2019 to August 2019

- Wearable technology, sensors, and medical devices
- Designed and created a hardware prototype of an on-skin capacitor-based pressure sensor array as a skin input interface for smart devices

Department of Electrical Engineering, Thapar University

Research Assistant, Smart Grid Lab, January 2017 to June 2018

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- Strengthened fundamentals of power electronics and digital/analog electronics
- Worked on designing and creating a hardware prototype of an electric vehicle battery charger

Punjab State Transmission Corporation Ltd, India

Intern, May 2016 to August 2016

- Interned at the utility company's 220kV substation in Ludhiana, India
- Gained first-hand experience with the transmission and distribution network of the province
- Worked with engineering team to ensure optimal operation of machines and protection devices
- Participated in periodic inspections based on electrical codes and standards

Lectures and Teaching Engagements

- University Course Guest Lecture
 - "Forensic Engineering: Real World Applications", University of Toronto FSC239: Forensic Sciences course, Mississauga, March 2024
- Seminar/Webinar Presenter
 - 'Electric Motorcycle Acceleration, Braking, and Regenerative Coasting Performance', Advantage Forensics, October 2023
 - 'Comparing the accuracy of image-based scanning techniques with laser scanners' seminar, Advantage Forensics, March 2023
 - 'Introduction to BERLA-iVE Vehicle Forensics' Seminar, Advantage Forensics, December 2021
 - 'Electrical Testing in Vehicles', Advantage Forensics webinar, January 2021
 - 'Probability of Frontal Airbag Deployment in Bumper-Bumper and Underride Collisions', Advantage Forensics webinar, July 2020
 - 'New Features and Improvements in PC Crash 12.0', Advantage Forensics webinar, Toronto, April 2020

ADDITIONAL COURSES, TRAINING & AWARDS

- Collision Reconstruction
 - 'An update on Motorcycle ABS Braking', Advantage Forensics, April 2024
 - 'Kinematic Performance of Micro-mobility Vehicles during Braking', Advantage Forensics, August 2023
 - 'Directionality of Rollover Damage and Abrasions', Advantage Forensics, June 2023
 - 'Occupant Kinematics in Simulated Autonomous Driving Vehicle Collisions', Advantage Forensics, May 2023
 - 'Perception Reaction Time with different levels of Blood Alcohol Concentration', Advantage Forensics, April 2023
 - 'World Reconstruction Exposition 2023', Orlando, Florida, April 2023
 - 'Advanced Collision Reconstruction with CDR Applications', Accident Analysis and Reconstruction, East Gwillumbury, March 2023
 - 'Advanced PC-Crash', PC Crash, PC Crash Advanced workshop, Los Angeles, February 2023



- 'Advanced Application of Perception-Reaction Time in Collision Reconstruction', Advantage Forensics seminar, January 2023
- 'Pedestrian Posture Effect on Impact Dynamics', Advantage Forensics Journal Club, January 2023
- 'Nighttime Visibility Site Investigations', Advantage Forensics Workshop, January 2023
- 'Tesla Vehicles', Impact Forensics, CATAIR Conference 2022, Aylmer, August 2022
- 'Moving Towards Self Driving Vehicles', Rimkus Consulting Group, CATAIR Conference 2022, Aylmer, August 2022
- 'Winter Track Testing of Collision Avoidance Systems', Transport Canada, CATAIR Conference 2022, Aylmer, August 2022
- 'IIHS Testing of AEB Systems', 30 Forensic Engineering, CATAIR Conference 2022, Aylmer, August 2022
- 'Scene Mapping using Drones', Gyro Flight and Safety Analysis Inc., CATAIR Conference 2022, Aylmer, August 2022
- 'Motorcycle Rider Training and Testing', Learning Curves workshop, Toronto, May 2022
- 'Traffic Safety Analysis', Advantage Forensics, February 2022
- 'Advanced Collision Avoidance Analysis', Advantage Forensics workshop, November 2021
- 'Berla iVe Vehicle Forensics System toolkit', Berla workshop, Orillia, November 1 to 5, 2021
- 'Recreational Vehicle EDRs', Advantage Forensics webinar, January 2021
- 'Journal Review: Talking and Driving', Advantage Forensics webinar, August 2020
- 'Driver Behavior in Adverse Weather Conditions', Advantage Forensics webinar, August 2020
- 'Vehicle acceleration rates from a stopped position', Advantage Forensics webinar, July 2020
- 'Detailed Vehicle Profile Crush Measurements Webinar', Laser Technology Inc, July 2020
- 'Collision Reconstructionist's Guide to Motorcycle Collision Analysis', Advantage Forensics webinar, July 2020
- 'Analysis of Searle, Wood & Intech Equations to Calculate Vehicle Impact Speed in Multiple Pedestrian Collisions', Advantage Forensics, webinar, July 2020
- 'Automatic Vehicle Data Forensics', Advantage Forensics, webinar, July 2020
- 'Delta-V from Curb Impacts' Advantage Forensics, webinar, June 2020
- 'Traffic Engineering', Canadian Association of Road Safety Professionals webinar, June 2020
- 'Relative Velocity Detection and Driver Response Time in Vehicle Following Scenarios: Current Data and Research on Looming Thresholds', Advantage Forensics webinar, June 2020
- 'Crash Avoidance Explained', Insurance Institute for Highway Safety webinar, June 2020
- 'Journal Review of Performance of Automatic Emergency Braking in Passenger Vehicles', Advantage Forensics webinar, June 2020
- 'Driver Checking Failures towards Pedestrians and Cyclists: An On-road Study', Canadian Association of Road Safety Professionals webinar, June 2020
- 'Traffic Trends and Safety in a COVID World', Transportation Research Board webinar, June 2020
- 'Identifying Road Design and Signage Issues in Relation to Motor Vehicle Collisions', Advantage Forensics webinar, May 2020
- 'Perception Reaction Time', Advantage Forensics webinar, April 2020
- 'Collision Avoidance Analysis', Advantage Forensics webinar, April 2020
- 'Human Factors in Collisions', Advantage Forensics webinar, April 2020
- Collision Reconstruction Journal Review Series, Advantage Forensics in-house seminar, Toronto, January 2020



- 'PC Crash 10.0 Assumptions & Inputs' workshop, Advantage Forensics in-house training, Toronto, January 2020
- 'Crash Energy Analysis' workshop, Advantage Forensics in-house training, Toronto, January 2020
- 'PC Crash 10.0 Simulations & Analysis' workshop, Advantage Forensics in-house training, Toronto, January 2020
- Video Forensic Analysis
 - 'Emerging Trends in Video Evidence' Webinar, iINPUT ACE, July 2021
 - 'Forensic Video Analysis: Video Literacy' Course, iINPUT ACE, June 2021
 - 'The Democratization of Video Evidence: Equipping Investigators with Modern Tools and Know-How', iINPUT ACE webinar, Toronto, March 2020
 - 'iINPUT ACE video analysis' workshop, Advantage Forensics in-house training, Toronto, January 2020
- Product and Material Failure Investigation
 - 'Forensic Engineering Outlook of Failure Analysis in Product and Mechanical Systems', Advantage Forensics in house seminar, Toronto, June 2020
- Fire Origin & Cause Investigation
 - 'NFPA 921 Fire and Explosion Course', Origin & Cause, Grimsby, September 2023
 - 'Fire Investigation 101: A Forensic Expert's Process & Mentality', Origin & Cause, September 2020
 - 'Through Fire and Water - Investigating Marine Fire & Explosion Claims', Origin & Cause, Aug 2020
 - 'Arc Mapping - Down to the Wire webinar', Origin & Cause, July 2020
 - 'Property Tech Talk: Fire Investigation', CEP Forensic, Toronto (Virtual), June 2020
 - "CFI Trainer.net Training Programs", CFI Trainer.net, online training modules (101 hours), January 2020 to July 2020
 - 30 tested modules covered topics on fire science, fire chemistry, thermodynamics, thermometry, fire dynamics, explosion dynamics, computer fire modelling, fire investigation, fire analysis, fire investigation methodology, fire investigation technology, hazardous materials, failure analysis & analytical tools, fire protection systems, evidence documentation, collection, & preservation, and electricity & electrical systems
- Expert Witness Training
 - 'Public Speaking Coaching', Eliezer Blatt, Toronto, March 2023
 - 'Handling Cross-Examination Under Pressure', Expert Eye Consulting Seminar, Oct 2021
 - 'Strategies for Relaying Verbal Findings', Advantage Forensics webinar, May 2020
 - 'Writing Formal Reports', Advantage Forensics webinar, May 2020
 - 'Writing Scientific Papers', Advantage Forensics webinar, May 2020
 - Health & Safety Awareness, Queen's University, Kingston, 2019

PAPERS, PUBLICATIONS & PROJECTS

- Coauthor, 'Your decision to invest in a modern vehicle may save your life', WP Magazine, May 2021
- Design of a Series Resonant Converter, Graduate project, Queen's University, 2019
- Design of V² Control for Buck Converter, Graduate project, Queen's University, 2019
- Design & Testing of an Electric Vehicle Battery Charger, Undergraduate research project, Thapar University, 2018
- Portable Power Supply via Solar Energy, Undergraduate Capstone project, Thapar University, 2017



PROFESSIONAL SOCIETIES & ASSOCIATIONS

- Professional Engineers of Ontario, Licensed Professional Engineer since 2023
- Canadian Association of Technical Accident Investigators and Reconstructionists, member since 2022
- Berla, Certified Vehicle Systems Forensic Technician, since 2021
- Berla, Certified Vehicle Systems Forensic Examiner, since 2021
- Society of Automotive Engineers International, member since 2022
- The American Society for Testing & Materials (ASTM), since 2023
 - Committee B01: Electrical Conductors
 - B01.02 Sub-committee: Methods of Test and Sampling Procedure
 - B01.04 Sub-committee: Conductors of Copper and Copper Alloys
 - B01.05 Sub-committee: Conductors of Ferrous Metals
 - B01.06 Sub-committee: Bi-Metallic Conductors
 - B01.07 Sub-committee: Conductors of Light Metals
 - Committee D09: Electrical and Electronic Insulating Materials
 - D09.01 Sub-committee: Electrical Insulating Products
 - D09.07 Sub-committee: Electrical Insulating Materials
 - D09.12 Sub-committee: Electrical Tests
 - D09.17 Sub-committee: Fire and Thermal Properties
 - Committee E05: Fire Standards
 - E05.11 Sub-committee: Fire Resistance
 - E05.14 Sub-committee: External Fire Exposures
 - E05.15 Sub-committee: Furnishings and Contents
 - E05.17 Sub-committee: Transportation
 - E05.21 Sub-committee: Smoke and Combustion Products
 - E05.22 Sub-committee: Surface Burning
 - E05.23 Sub-committee: Combustibility
 - E05.31 Sub-committee: Terminology and Services/Functions
 - E05.32 Sub-committee: Research
 - E05.33 Sub-committee: Fire Safety Engineering
 - E05.41 Sub-committee: International Standards for Fire Initiation and Growth
 - E05.42 Sub-committee: Fire Containment
 - E05.43 Sub-committee: Fire Threat to People and the Environment
 - E05.44 Sub-committee: Fire Safety Engineering
 - Committee E44: Solar, Geothermal and Other Alternative Energy Sources
 - E44.09 Sub-committee: Photovoltaic Electric Power Conversion
 - Committee F01: Electronics
 - F01.15 Sub-committee: Compound Semiconductors
 - F01.18 Sub-committee: Printed Electronics
 - Committee F15: Consumer Products
 - F15.41 Sub-committee: Fun Karts
 - F15.58 Sub-committee: Powered Scooters and Skateboards
 - Committee F18: Electrical Protective Equipment for Workers
 - F18.15 Sub-committee: Worker Personal Equipment
 - F18.25 Sub-committee: Insulating Cover-Up Equipment
 - F18.35 Sub-committee: Tools & Equipment
 - F18.55 Sub-committee: Inspection and on-Destructive Test Methods for Aerial Devices
 - F18.65 Sub-committee: Wearing Apparel
 - F18.93 Sub-committee: National/International Standards Review
 - Committee F45: Robotics, Automation, and Autonomous Systems
 - F45.01 Sub-committee: Environmental Conditions and Effects
 - F45.02 Sub-committee: A-UGV Docking and Navigation
 - F45.03 Sub-committee: A-UGV Object Detection and Protection
 - F45.04 Sub-committee: System Communication and Interoperability
 - F45.05 Sub-committee: Grasping and Manipulation
 - F45.91 Sub-committee: Terminology