

# Siril Dukkupati

📍 Montréal    ✉ sirilteja.dukkupati@gmail.com    ☎ +1 438 345 6704    🌐 siril.me    in siril-td    📱 siril-teja

## Summary

Soon-to-be PhD in Biomechanics with a hands-on experience in bio-mechatronic systems, spanning mechanical design and control systems. Skilled in experimental design, data analysis, and scientific communication. Demonstrated leadership in managing research teams and building cross-disciplinary collaborations. Strong communicator and dependable team player, passionate about advancing musculoskeletal health.

## Education

### McGill University

Jan 2022 – (Aug 2025)

*PhD in Mechanical Engineering*

- **Thesis Title:** Development of Novel Spine Biomechanical Analogue and Digital Models Towards Realizing a Robotic Spine Simulator

*MS in Mechanical Engineering*

Sept 2020 – Dec 2021

- **GPA:** 4.0/4.0; Fast-tracked into PhD
- **Coursework:** Biofluids and Cardiovascular Mechanics, Musculoskeletal Biomechanics, Control Systems, Advanced Materials, Medical Device Design and Regulations

## Experience

### Course Lecturer

Montréal, CA

*McGill University*

Jan 2024 – present

- MECH 561: Biomechanics of Musculoskeletal Systems

### Teaching Assistant

Montréal, CA

*McGill University*

Sept 2020 – present

- MECH 262 (Electronics Lab), 290 (Engineering Design), 360 (Manufacturing Lab), BIEN 505 (Medical Device Design and Regulations)

### Biomedical engineer (part-time)

Montréal, CA

*Simcare Tech* [🔗](#)

Aug 2024 – present

- Simcare is a lab spin-off based on the technology I developed during my doctoral work.
- Developed custom biomechanical phantoms of the spine and musculature for industry partners.

### CTO, Mechanical Engineer

Bangalore, IN

*Foodlabs Inc.* [🔗](#)

Jul 2020 – Sept 2024

- Led a team of engineers to develop an AI software platform for user-centric digital cooking platform.
- Designed and deployed a robotic hardware automated kitchen ecosystem.
- Wrote patent applications currently under review at the Indian Patent Office

## Projects

### SpineSim Validation

*MDsim Inc.* [🔗](#)

- Built patient-specific spine biomechanical phantoms and analyzed its performance pre- and post- L3-L4 posteriolateral spinal fusion surgery.
- Generate validation data for SpineSim, a digital twin platform with applications in spinal surgery planning.

### International Spine Biomechanics Consortium

*Cleveland Clinic* [🔗](#)

- Formed a working group of 7 top spine biomechanics research labs focused on experimental testing.
- Designed testing methodologies for multi-lab, multi-dimensional characterization of spine surrogates to establish a standard in spine testing.
- Presented at international conferences like ORS and ISTA.

## McGill - Wake Forest Collaboration

[Brown Lab](#) 

- Formed a collaboration with Dr. Philip Brown's lab at Wakeforest University to perform full-field, multi-specimen, multi-lab, multi-protocol spine surrogate testing.
- The research provides an understanding of the biomechanics of spine phantoms under multi-planar loading scenarios commonly seen in daily activities.
- Partly funded by the **Orthopaedic Research Society** 2024 Travel Grant.

## Mars Rover Manipal

[Manipal University](#) 

- Led a team of 4 as Research Lead (2019) on robotic exploration projects, including an autonomous vehicles and underactuated robotic arms.
- Developed a Mars Rover prototype with autonomous navigation, equipment servicing, and astronaut assistance capabilities.
- Ranked 1st place globally at the Indian Rover Challenge (IRC 2017) and 7th place worldwide at the University Rover Challenge (URC 2018, Utah, USA).

## Awards & Achievements

---

Total awards amounting to **160K+ USD**

- GREAT Travel Award 2022, 24, McGill University, CA.
- Fonds de recherche du Québec–Nature et Technologies Doctoral Research Scholarship 2024, CA.
- Fonds de recherche du Québec–Nature et Technologies Master's Research Scholarship 2022, CA.
- McGill Engineering Doctoral Award (MEDA) 2022, McGill University, CA.
- Graduate Excellence Award 2020, 2021, 2022, 2023, 2024, McGill University, CA.
- Best Paper Award - RIACT 2020 Conference, IN.
- Rubin Gruber SURE Award 2019, McGill University, CA.
- Manipal Scholar Award 2016 - 2020, Manipal University, IN.

## Technologies

---

**Languages:** MATLAB, LabVIEW, Python, C/C++, HTML

**Modeling:** Catia, AutoCAD, SOLIDWORKS, Fusion 360, nTopology


**Analysis:** Ansys Workbench, Adams

**Technologies:** 3D Printing - FDM & SLA, CNC lathe and milling, Manual lathe and milling

## Publications

---

### Journal Articles:

1. **Dukkipati, S.**, Driscoll, M., (2024) Design Improvements and Validation of a Novel Fully 3D Printed Analogue Lumbar Spine Motion Segment. *Journal of Bionic Engineering* 21, 1388–1396. [DOI](#) 
2. **Dukkipati, S.**, Driscoll, M., (2025) Development and Biomechanical Evaluation of a 3D Printed Analogue of the Human Lumbar Spine. *3D Printing in Medicine* 11, 3. [DOI](#) 
3. **Dukkipati, S.**, Driscoll, M., (2025) Evaluation of a Fast-Solving Rigid Body Spine Model Inclusive of Intra-Abdominal Pressure. *IEEE Transactions on Biomedical Engineering*. [DOI](#)  [GitHub](#) 
4. **Dukkipati, S.**, Driscoll, M., (2025) An Integrated Rigid-Flexible Body Dynamic Approach to Computationally Efficient Musculoskeletal Modeling and Muscle Recruitment Simulation of the Spine and Torso. *IEEE Transactions on Biomedical Engineering* (under review) [Preprint](#)  [GitHub](#) 

### Conference Talks:

1. **Dukkipati, S.**, Driscoll, M., (2025) Exploration of Influence of the Thoracolumbar Fascia and the Abdominal Cavity on Spine Stiffness and Load Sharing During Flexion Movements, Fascia Research Congress, New Orleans, Louisiana, USA. (*upcoming*)

2. Coltoff, E.C., **Dukkipati, S.**, Brown, P.H., Driscoll, M., (2025) Novel Spinal Modeling & Testing Methods Research Exchange: ORS Spine Section Travel Grant 2024 (Coltoff), Orthopaedic Research Society (ORS) 2025 Annual Meeting, Phoenix, Arizona, USA.
3. **Dukkipati, S.**, Driscoll, M., (2024) Novel Benchtop and In silico Alternatives to Traditional Spine Biomechanics Research Methodologies, 10th International Conference on Mechanics and Materials in Design (M2D 2024), Nagoya, Japan. [Abstract](#) [🔗](#)
4. **Dukkipati, S.**, Driscoll, M., (2024) A Systematic Benchtop Construction and Deconstruction Study of Spinal Ligaments Using Novel 3D Printable Analogue Spine Models, International Society for Technology in Arthroplasty (ISTA), Nashville, USA. [Abstract](#) [🔗](#)
5. Wahbeh, J., Loss, J.G., Coltoff, E.C., **Dukkipati, S.**, Chastain, K., Pelletier, M., Wang, T., Brown P.J., Driscoll M., Sangiorgio S.N., Ebrahimzadeh E., Meyers K., Walsh W., Cornwall B., Kelly B., Colbrunn R., (2024) Composite Lumbar Spine Surrogate Biomechanical Variability During Multi-Laboratory Collaborative Testing, International Society for Technology in Arthroplasty (ISTA), Nashville, USA. [Abstract](#) [🔗](#)
6. Wahbeh, J., Loss, J.G., Coltoff, E.C., **Dukkipati, S.**, Chastain, K., Pelletier, M., Wang, T., Brown P.J., Driscoll M., Sangiorgio S.N., Ebrahimzadeh E., Meyers K., Walsh W., Cornwall B., Kelly B., Colbrunn R., (2024) Temporal Variation in Artificial Composite Spinal Surrogates Through Inter-Laboratory Spine Biomechanics Testing, International Society for Technology in Arthroplasty (ISTA), Tennessee, USA. [Abstract](#) [🔗](#)
7. **Dukkipati, S.**, Driscoll, M., (2024) Quantifying the Effect of Ligament Tears on Lumbar Spine Stiffness: A Systematic Construction and Deconstruction Study Using Novel 3D Printable Analogue Spine Models, EUROSPINE Annual Meeting, Vienna, Austria. [Abstract](#) [🔗](#)
8. **Dukkipati, S.**, Driscoll, M., (2024) 3D Printable Analogue Spine Models: Towards Cost and Time Effective Spinal Biomechanical Research, IMAC-XLII, Society of Experimental Mechanics, Orlando, Florida, USA. [Abstract](#) [🔗](#)
9. **Dukkipati, S.**, Driscoll, M., (2024) Effect of Ligaments on Lumbar Spinal Stiffness: A Systematic Investigation Using Novel 3D-Printed Analogue Spine Models, IMAC-XLII, Society of Experimental Mechanics, Orlando, Florida, USA. [Abstract](#) [🔗](#)
10. **Dukkipati, S.**, Driscoll, M., (2022) Viscoelastic Properties of a 3D Printed Analogue of Thoracolumbar Fascia, Fascia Research Congress, Montreal, Canada. [Abstract](#) [🔗](#)
11. **Dukkipati, S.**, Driscoll, M., (2022) Design and Validation of 3D Printed Analogous Lumbar Model for Use in a Robotic Benchtop Spine Model, European Solid Mechanics Conference, Galway, Ireland. [Abstract](#) [🔗](#)

#### Conference Poster Presentations:

1. **Dukkipati, S.**, Driscoll, M., (2025) Evaluation of an Intra-abdominal Pressure Inclusive Rigid Body Dynamic Torso Model for Fast-solving High-fidelity Simulations, Global Spine Congress 2025, Rio de Janeiro, Brazil. (*upcoming*)
2. **Dukkipati, S.**, Driscoll, M., (2025) Validation of a Fast-Solving Rigid-Flexible Body Dynamic Model of the Spine for Use in Muscle Recruitment Optimization Problems, 25rd Annual Scientific Conference of The Canadian Spine Society, Charlevoix, Quebec, Canada. [Poster](#) [🔗](#)
3. **Dukkipati, S.**, Driscoll, M., (2025) Development of a Novel Rigid-Flexible Body Dynamic Model as a High-Fidelity Parametric Biomechanical Digital Twin of the Human Torso, 25rd Annual Scientific Conference of The Canadian Spine Society, Charlevoix, Quebec, Canada. [Poster](#) [🔗](#)
4. **Dukkipati, S.**, Driscoll, M., (2025) Development And Validation Of A High Fidelity Rigid Body Spine Model Inclusive Of Intra-abdominal Pressure, Orthopaedic Research Society (ORS) 2025 Annual Meeting, Phoenix, Arizona, USA. [Abstract](#) [🔗](#)
5. **Dukkipati, S.**, Driscoll, M., (2025) Biomechanical Evaluation Of Fully 3D Printable L1-S1 And L2-L5 Spine Surrogates In Pure Moment Loading, Orthopaedic Research Society (ORS) 2025 Annual Meeting, Phoenix, Arizona, USA. [Abstract](#) [🔗](#)

6. Coltoff, E.C., Loss, J.G., **Dukkipati, S.**, Driscoll, M., et al. (2024) Biomechanical Variability in Composite Lumbar Spine Surrogates During Multi-Laboratory Collaborative Testing, Summer Biomechanics, Bioengineering, and Biotransport Conference (SB3C), Lake Geneva, Wisconsin, USA. [Abstract](#) [🔗](#)
7. Coltoff, E.C., Loss, J.G., **Dukkipati, S.**, Driscoll, M., et al. (2024) Temporal Variability in Composite Lumbar Spine Surrogates During Multi-Laboratory Collaborative Testing, Summer Biomechanics, Bioengineering, and Biotransport Conference (SB3C), Lake Geneva, Wisconsin, USA. [Abstract](#) [🔗](#)
8. **Dukkipati, S.**, Driscoll, M., (2024) Ligament Damage Models in the Lumbar Spine: Modeling Using a Novel 3D printable Analogue Model, 24rd Annual Scientific Conference of The Canadian Spine Society, Whistler, British Columbia, Canada. [Poster](#) [🔗](#)
9. Coltoff, E.C., Loss, J.G., **Dukkipati, S.**, Driscoll, M., et. al. (2024) Composite Lumbar Spine Surrogate Biomechanical Variability During Multi-Laboratory Collaborative Testing, Orthopaedic Research Society (ORS) 2024 Annual Meeting, Long Beach, California, USA. [Abstract](#) [🔗](#)
10. Coltoff, E.C., Loss, J.G., **Dukkipati, S.**, Driscoll, M., et. al. (2024) Temporal Variation in Artificial Composite Spinal Surrogates through Inter-laboratory Spine Biomechanics Testing, Orthopaedic Research Society (ORS) 2024 Annual Meeting, Long Beach, California, USA. [Abstract](#) [🔗](#)
11. **Dukkipati, S.**, Driscoll, M., (2023) Rotational Stiffness in a Fully 3D Printed Biomechanical Analogue of the Lumbar Spine, Global Spine Congress 2023, Prague, Czech Republic. [Poster](#) [🔗](#)
12. **Dukkipati, S.**, Driscoll, M., (2023) Estimating the Effect of Ligaments on Spinal Stiffness by Systematic Construction of an L1-S1 Analogue Spine Model, Global Spine Congress 2023, Prague, Czech Republic. [Poster](#) [🔗](#)
13. **Dukkipati, S.**, Driscoll, M., (2023) On the Effect of Thoracolumbar Fascia on Lumbar Spine Stiffness Under Loading in an Analogue Spine Setup, Global Spine Congress 2023, Prague, Czech Republic. [Poster](#) [🔗](#)
14. **Dukkipati, S.**, Driscoll, M., (2023) Pure Bending Stiffness in a Fully 3D Printed L1-S1 Lumbar Spine Model, 4th International workshop on spinal loading and deformation, Berlin, Germany. [Poster](#) [🔗](#)