Ahmed **Darwish**

Assistant Professor · Mechanical Engineering

Mechanical Power Engineering Department, Faculty of Engineering, Assiut University, Assiut, Egypt, 71516

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Education

Concordia University — *Montreal, QC, Canada*
PhD Mechanical Engineering — *2017 - 2022*
- Advisor: Dr. Lyes Kadem

Assiut University — *Assiut, Egypt*
MS Mechanical Engieering — *2011 - 2016*
- Advisor: Dr. Mahmoud Ahmed

Assiut University — *Assiut, Egypt*
BS Mechanical Engineering — *2005 - 2010*
- Honors

Professional Experience

2017-2022	**Graduate Research Assistant**, Concordia University
2021-2022	**CTO-Data Analysis: Laboratory of Cardiovascular Fluid Dynamics**, Concordia University
2019-2021	**Co-director : Laboratory of Cardiovascular Fluid Dynamics**, Concordia University
2017-2019	**Manager: Laboratory of Cardiovascular Fluid Dynamics**, Concordia University
2017-2021	**Graduate Teaching Assistant**, Concordia University
2016-2017	**Research Assistant**, Assiut Micro-fluidics Lab
2011-2017	**Assistant Lecturer**, Assiut University

Publications

Journal Articles

[1] **Ahmed Darwish**, Shahrzad Norouzi, Lyes Kadem. 2022. Spectral-Clustering of Lagrangian Trajectory Graphs: Application to Abdominal Aortic Aneurysms. Cardiovascular Engineering and Technology.

[2] **Ahmed Darwish**, Shahrzad Norouzi, Giuseppe Di Labbio, Lyes Kadem. 2021. Extracting Lagrangian Coherent Structures in Cardiovascular Flows Using Lagrangian Descriptors. Physics of Fluids, 33(10).

[3] Philip C. Wiener, **Ahmed Darwish**, Evan Friend, Lyes Kadem, Gregg S. Pressman. 2021. Energy loss associated with *in-vitro* modeling of mitral annular calcification. PLoS ONE, 16(2): e0246701.

[4] **Ahmed Darwish**, Giuseppe Di Labbio, Wael Saleh, Lyes Kadem. 2021. Proper Orthogonal Decomposition Analysis of the Flow Downstream of a Dysfunctional Bileaflet Mechanical Aortic Valve. Cardiovascular Engineering and Technology, 12: 286–299.

[5] Amanda Mikhail, Giuseppe Di Labbio, **Ahmed Darwish**, Lyes Kadem. 2020. How pulmonary valve regurgitation after tetralogy of fallot repair changes the flow dynamics in the right ventricle: An in vitro study. Medical Engineering & Physics, 83: 48-55.

[6] Chloé Papolla, **Ahmed Darwish**, Lyes Kadem, Régis Rieu. 2020. Impact of Mitral Regurgitation on the Flow in a Model of a Left Ventricle. Cardiovascular Engineering and Technology, 11, 708–718.

[7] **Ahmed Darwish**, Giuseppe Di Labbio, Wael Saleh, Lyes Kadem. 2020. *In vitro* characterization of Lagrangian fluid transport downstream of a dysfunctional bileaflet mechanical aortic valve. AIP Advances, 10(9)

[8] **Ahmed Darwish**, Giuseppe Di Labbio, Wael Saleh, Othman Smadi, Lyes Kadem. 2019. Experimental investigation of the flow downstream of a dysfunctional bileaflet mechanical aortic valve. Artif Organs. 2019; 43: E249– E263.

Conferences

[1] Wissam Abdallah, **Ahmed Darwish**, Julio Garcia, Lyes Kadem, "Towards a rapid extraction of three-dimensional Lagrangian coherent structures from in vivo 4D-MRI." Bulletin of the American Physical Society (2022)

[2] **Ahmed Darwish**, Ghassan Maraouch, Lyes Kadem, "Network-based study of Lagrangian trajectories to highlight the effect of bioprosthetic mitral valve oreintation." Bulletin of the American Physical Society (2022)

[3] Nathan Chan, **Ahmed Darwish**, Wael Saleh, Lyes Kadem, Hoi Dick Ng, Hamid Ait Abderrahmane, "Experimentally simulating the formation of polygonal patterns by systems of satellite vortices." Bulletin of the American Physical Society (2022)

[4] GS Pressman, **A Darwish**, EJ Friend, PC Wiener, L Kadem, "Severe MAC increases shear stresses on particles traversing the mitral valve: an in vitro study." European Heart Journal - Cardiovascular Imaging, Volume 23, Issue Supplement_1, February 2022, jeab289.366

[5] Lê-Danguy des Déserts, Mai-Xuân, **Ahmed Darwish**, and Lyes Kadem. "Revealing Flow Transport Barriers in Cardiovascular Flows Using Complex Networks: Application to Edge-to-Edge Mitral Valve Repair." Bulletin of the American Physical Society 66 (2021).

[6] Wissam Abdallah, **Ahmed Darwish**, Julio Garcia, and Lyes Kadem. "In vivo characterization of Lagrangian Coherent Structures Using Lagrangian Descriptors: Application to Left Ventricular flows." Bulletin of the American Physical Society 66 (2021).

[7] Philip C Wiener, **Ahmed Darwish**, Evan Friend, Lyes Kadem and Gregg S Pressman."Abstract 11160: In-vitro Testing of 3D-Printed Mitral Valves With Phantom Mitral Annular Calcification." 2019 Circulation. Vol. 140, No. Suppl_1

[8] **Ahmed Darwish** and Mohamed Abdelgawad. "Numerical simulation of photothermally induced Marangoni flow around a microbubble." In 2019 IEEE 14th International Conference on Nano/Micro Engineered and Molecular Systems (NEMS), pp. 524-528. IEEE, 2019.

[9] **Ahmed Darwish**, Giuseppe Di Labbio, Wael Saleh, and Lyes Kadem. "Modal Decomposition and Lagrangian Coherent Structures Analysis of Flow Past a Dysfunctional Mechanical Aortic Valve." Bulletin of the American Physical Society 63 (2018).

[10] **Ahmed Darwish**, Wael F. Saleh, Giuseppe Di Labbio, and Lyes Kadem. "In-Vitro Investigation Of The Effect Of A Dysfunctional Bileaflet Mechanical Aortic Valve On Flow Characteristics In The Ascending Aorta." (2018). Canadian Society for Mechanical Engineering (CSME) International Congress.

[11] **Darwish, A**, El-Dosoky, MF, Ahmed, MA, Abdel-Hafez, OE. "Boundary Layer Control of an Axial Compressor Cascade Using Nonconventional Vortex Generators." Proceedings of the ASME 2015 International Mechanical Engineering Congress and Exposition. Volume 1: Advances in Aerospace Technology. Houston, Texas, USA. November 13–19, 2015.

[12] **Darwish, A**, El-Dosoky, MF, Ahmed, MA, Abdelhafez, OE. "Effect of a New Vortex Generator on the Performance of an Axial Compressor Cascade at Design and Off-Design Conditions." Proceedings of the ASME 2015 International Mechanical Engineering Congress and Exposition. Volume 1: Advances in Aerospace Technology. Houston, Texas, USA. November 13–19, 2015.

[13] **Darwish, A**, El-Dosoky, MF, Abdel-Hafez, OE, Ahmed, MA. "Secondary Flow Control on Axial Flow Compressor Cascade Using Vortex Generators." Proceedings of the ASME 2014 International Mechanical Engineering Congress and Exposition. Volume 1: Advances in Aerospace Technology. Montreal, Quebec, Canada. November 14–20, 2014.

Awards, Fellowships, & Grants

2021	**Concordia Faculty Support Bursary**, Concordia University	*$ 20,000*
2020	**Concordia University Conference and Exposition Award**, Concordia University	*$ 1000*
2020	**Concordia Faculty Support Bursary**, Concordia University	*$ 20,000*
2019	**Concordia University Conference and Exposition Award**, Concordia University	*$ 1000*
2019	**Concordia Faculty Support Bursary**, Concordia University	*$ 20,000*
2018	**IEEE-UFFC Travel grant**, IEEE	*$ 1000*
2018	**Concordia Faculty Support Bursary**, Concordia University	*$ 20,000*
2017	**Concordia International Tuition Award of Excellence**, Concordia University	*$ 40,000*

Outreach & Professional Development

Development

IEEE-UFFC: Ultrasound motion imaging, Simulations Phantom experimentations, Lyon, France.

Machine Learning for Fluid Mechanics: Analysis, Modeling, Control and Closures, Sint Genesius rode, Belgium

Peer Review

Artificial Organs
Physics of Fluids
IEEE Journal of Biomedical and Health Informatics
Journal of Applied Fluid Mechanics

Professional Memberships

American Physical Society
American Society of Mechanical Engineers
Canadian Society of Mechanical Engineering
Egyptian Engineering Syndicate
IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society Membership