

# Mohammad Afzal Shadab

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## EDUCATION

- Doctor of Philosophy** | *Computational Science, Engineering & Mathematics* Aug 2019 – Aug 2024 (Expected)  
The University of Texas at Austin, United States GPA: 3.90/4.0  
Advisor: Prof. Marc Hesse
- Master of Science** | *Computational Science, Engineering & Mathematics* Aug 2019 – Aug 2021  
The University of Texas at Austin, United States GPA: 3.90/4.0  
Advisor: Prof. Marc Hesse
- Master of Philosophy** | *Mechanical Engineering* Aug 2016 – Sept 2018  
The Hong Kong University of Science and Technology, Hong Kong GPA: 4.0(A)/4.3(A+)  
Thesis: Fifth-order Finite Volume WENO in General Orthogonally-curvilinear Coordinates 📄  
Advisor: Prof. Kun Xu
- Bachelor of Technology** | *Mechanical Engineering* Aug 2012 – June 2016  
Aligarh Muslim University, India GPA: 9.62/10.0  
Thesis: Designing and Analysis of Supersonic Combustion Ramjet Engine 📄  
Advisor: Prof. M.F. Baig


## RESEARCH EXPERIENCE

- Improving the Numerical Toolset for Geodynamics of Icy Oceans World** NASA Jet Propulsion Lab  
NASA Jet Propulsion Lab Graduate Fellow (Stipend: \$1,100/week) June 2023 – August 2023  
Advisor: Dr. Steven Vance
  - Developing a code for single phase flow in viscously compacting matrix.
  - Implementing tracers into melt migration code across ice shells of icy ocean worlds.
- Modeling Meltwater Percolation in Greenland's Firn** NASA Jet Propulsion Lab, Caltech  
NASA Jet Propulsion Lab Graduate Fellow (Stipend: \$900/week) May 2022 – July 2022  
Advisor: Dr. Surendra Adhikari
  - Developed a two-dimensional, three-phase (snow/water/air), firn infiltration simulator.
  - Derived and validated vertically integrated model for meltwater gravity currents.
  - Formulated kinematic wave theory of firn infiltration, inverted for model parameters and investigated meltwater infiltration in Greenland.
- Two Phase Flow in Viscously Compacting Matrix** The University of Texas at Austin  
Graduate Research Assistant, *Doctoral Thesis* (Stipend: \$2,500/month) August 2019 – Present  
Advisor: Prof. Marc Hesse
  - Developed and validated a conservative finite-difference based solver in Python for simulating a 2D two-phase flow in non-deforming porous media.
  - Implemented the solver to study the behavior of Post Impact Hydrothermal systems on Mars.
  - Implementing the solver to investigate the melt percolation on ice masses to study effects of global warming.
- Investigating Groundwater Flows using Physics Informed Neural Networks** 📄 UT Austin  
*Independent Research* August 2020 – Present  
Collaborators: DingCheng Luo, Yiran Shen, Eric Hiatt, and Prof. Marc Hesse
  - Wrote python codes for data-driven discovery of steady-state PDE from experimental data.
  - Investigated the effect of PDE regularization in PINNs and the role of PDE & data misfit.
  - Learned the PDE parameters and boundary conditions for the transient seepage across edge of a porous reservoir simulated using finite-differencing.
- Free Fall of a Viscous Drop in a Viscoelastic Medium** 📄 Massachusetts Institute of Technology  
Visiting Graduate Student Researcher (Stipend: \$2,150/month) October 2018 – April 2019  
Advisor: Prof. Irmgard Bischofberger

- Performed a literature review of computational and experimental methods for investigating drop dynamics.
- Designed the experiments and apparatus with high-speed imaging.
- Wrote MATLAB scripts for analyzing moving camera videos using template matching.

**High-Order Finite-Volume Reconstruction in Curvilinear Coordinates**  HKUST, Hong Kong  
 Graduate Research Assistant, *M.Phil. Thesis* (Stipend: \$2,150/month) December 2016 – September 2018  
*Advisor:* Prof. Kun Xu


- Proposed a general theory for state-of-art fifth order finite volume WENO in curvilinear coordinates.
- Derived analytical relations and developed Fortran codes along with Riemann solvers and gas-kinetic scheme.

**Modal Decomposition Techniques on a Thermoacoustic System**  HKUST & U of Cambridge  
 Collaborative Research (Stipend: \$2,150/month) August 2016 – December 2016  
*Advisor:* Prof. Larry Li

- Analyzed and compared the prominent modal decomposition techniques for developing low order models.
- Investigated nonlinear interactions between flame & external forcing for different amplitudes & frequencies.

**Designing & Analysis of Supersonic Combustion Ramjet Engine**  Aligarh Muslim University, India  
*Bachelor's Thesis* September 2015 – June 2016  
*Advisor:* Prof. M.F. Baig

- Developed and validated Fortran codes for designing Scramjets and analyzed its performance during unstart.
- Proposed Single-Input-Single-Output mechanism based on pressure feedback to avert engine unstart.

**Effective Lewis Number for Multicomponent Hydrocarbon-Air Mixtures**  IIT-Delhi, India  
 Summer Research Intern June 2015 – August 2015  
*Advisor:* Prof. M.R. Ravi

- Analyzed combustion characteristics of methane and natural gas mixtures with varying hydrogen blending.
- Performed the experiments using constant pressure combustion chamber apparatus with Schlieren imaging.
- Simulated the corresponding flames in 1D on CHEMKIN using PREMIX module.


## INDUSTRIAL EXPERIENCE AND PROJECTS

**Hummingbird – Wearable Device for Exchanging Information**  MIT & Hong Kong Innovation Node  
 Co-founder (*US based Startup Project*) May 2018 – February 2019

- Ideated and validated consumer problems and market opportunities through market research.
- Designed prototype on AutoCAD, fabricated using 3D printing, and implemented fast & accurate algorithms.
- Received MIT Sandbox Innovation Fund worth \$5000 and won both Judge's & Audience Awards at MIT Entrepreneurship and Maker Skills Integrator program (2018).

**Industrial Compressors and Gas Turbines**  Gas Authority of India Limited, India  
 Summer Intern June 2014 – July 2014

- Worked at a C2C3 plant at GAIL, participating in its pre-commissioning and commissioning testing.
- Studied the working of several industrial compressors and a gas turbine (Siemens SGT700).

**Formula Student Race Car and Hybrid Tricycle**  Society of Automotive Engineers, Aligarh Chapter  
 Technical Member & Team Lead January 2013 – June 2014

- Conceptualized ergonomically designed the vehicles with improved aerodynamic performance.
- Designed the vehicles on AutoCAD, simulated on ANSYS, and then finally fabricated.

## TEACHING EXPERIENCE

<b>GEO 325M/398M Numerical Modeling in the Geosciences</b> <a href="#"></a> (Level: Graduate) University of Texas at Austin <i>Position:</i> Teaching Assistant, <i>Instructor:</i> Prof. Marc Hesse	Spring 2023 Austin
<b>GEO 325C/398C Continuum Mechanics</b> <a href="#"></a> (Level: Graduate) University of Texas at Austin <i>Position:</i> Teaching Assistant, <i>Instructor:</i> Prof. Marc Hesse	Fall 2022 Austin
<b>MECH-1907 Introduction to Aerospace Engineering (Level: Freshman, Sophomore)</b> The Hong Kong University of Science and Technology <i>Position:</i> Teaching Assistant, <i>Instructor:</i> Prof. Rhea Liem	Spring 2018 Hong Kong
<b>MECH-3690 Aerospace Engineering Laboratory (Level: Senior, Junior)</b> The Hong Kong University of Science and Technology <i>Position:</i> Teaching Assistant, <i>Instructor:</i> Prof. Jinglei Yang	Spring 2017 Hong Kong

For all teaching feedback reports and certificates, click .

## HONORS AND AWARDS

<b>NASA Jet Propulsion Laboratory Graduate Fellowship</b> <a href="#"></a> To investigate life supporting conditions on Europa with Dr. Steve Vance at JPL.	June - Aug 2023 \$11,000
<b>UT Austin Graduate School Summer Fellowship</b> <a href="#"></a> Awarded based on academic standing and research experience supported by recommendations.	June - Aug 2023 \$11,527
<b>UT Austin Professional Development Award</b> <a href="#"></a> For presenting two researches conducted at the UT Austin.	October 2022 \$500
<b>NASA Jet Propulsion Laboratory Graduate Fellowship</b> <a href="#"></a> To study effect of climate change on Greenland ice sheet with Dr. Surendra Adhikari at JPL.	April - June 2022 \$9,000
<b>Purdue Climate Scholar by Purdue University and Office of Naval Research</b> <a href="#"></a> To attend Summer Institute for Sustainability & Climate Change at Purdue University.	June - Aug 2022 \$4,000
<b>MIT - Houston Energy Innovation Student Fellow</b> <a href="#"></a> Representing UT Austin as a liaison between MIT's Martin Trust Center and Greentown Labs.	Mar 2022 - May 2023
<b>Lunar and Planetary Institute Career Development Award</b> <a href="#"></a> For first author abstract and application materials submitted at LPSC 2022.	Feb 2022 \$1,000
<b>UT Austin Cactus Standout Award (estd. 1894)</b> <a href="#"></a> For academic excellence and leadership contributions. Inducted into Annual Yearbook, 2022.	April 2022
<b>Student Research Award in Planetary Habitability by Cent. for Planetary Sys. Habitability</b> <a href="#"></a> For proposal on finding life-supporting conditions on Europa using computational methods.	Jan 2022 \$16,425
<b>Outstanding Student Presenters Award by Unsaturated Zone Technical Committee, AGU</b> <a href="#"></a> Third prize for oral presentation: H52D-10 Rainwater Infiltration at AGU Fall Meeting 2021. <a href="#"></a>	Dec 2021 \$175
<b>SIAM Certificate of Recognition by Society for Industrial and Applied Mathematics</b> For outstanding service and contributions to the UT Austin Student Chapter of SIAM.	February 2021
<b>University of Texas Institute for Geophysics Student Fellowship by UTIG, UT Austin</b> Year-long fellowship covering tuition, insurance & stipend awarded for collaborative research.	January 2021 \$2,491/month
<b>Best Teaching Assistant Award - II by Dept of Mech &amp; Aero Engg, HKUST</b> Awarded for MECH-1907 Introduction to Aerospace Engineering course based on student surveys and jury of professors.	August 2018 HK\$300
<b>Judge's Award and Audience Award at MIT MEMSI Program</b> Awarded by MIT and Hong Kong Innovation Node to best startup idea & pitch in the program.	June 2018

<b>Outstanding Contribution in Reviewing Recognition by Journal of Computational Physics</b>	June 2018
For being in the top 10th percentile of reviewers.	
<b>Postgraduate Studentship by HKUST</b>	Aug 2016 – Sept 2018
Competitive stipend for research postgraduate students (M.Phil.) at HKUST.	\$2,150/month
<b>Global Scholar Award by Sir Syed Education Society of North America</b>	May 2015
For top 20 students of AMU based on their academic achievements and research, for higher education.	\$1,000
<b>National Summer Research Fellowship by Indian Academy of Sciences</b>	March 2015
Awarded national fellowship to pursue research in Indian research institutes like IITs/IISc.	\$220/month
<b>University Merit Scholarship by AMU Alumni Association Toronto, Canada</b>	March 2015
Merit based scholarship for students pursuing education at AMU.	\$70

## PEDAGOGICAL TRAINING

<b>Inclusive Classrooms Leadership Certificate Seminar Series</b>	Spring 2023
The University of Texas at Austin	Austin
Learned strategies for developing and sustaining an inclusive classroom along with course design.	
<b>Advanced Teaching Preparation Series Certificate</b>	Spring – Fall 2022
The University of Texas at Austin	Austin
Advance teaching certificate for learning and practicing techniques of good classroom teaching.	
<b>Graduate Teaching Assistant Training Program</b>	Fall 2017 – Spring 2018
The Hong Kong University of Science and Technology	Hong Kong
Learned the fundamentals of teaching assistantship and effective pedagogy.	


## TRAVEL GRANTS AND FUNDED SHORT SCHOOLS


<b>Center for Planetary Systems' Habitability Student Travel Funding Award</b>	February 2023
Received a travel grant to attend the LPSC 2023.	\$1000
<b>Early Career Tiny Grants - AGU Ecohydrology Committee</b>	December 2022
For early-career scientists presenting ecohydrology-related work at the AGU Fall Meeting 2022.	\$214
<b>Center for Planetary Systems' Habitability Student Travel Funding Award</b>	February 2022
Awarded a travel grant to attend the LPSC 2022.	\$1000
<b>AGU Fall Meeting Grant</b>	December 2021
Awarded a travel grant by UT Austin to attend the AGU Fall Meeting 2021.	
<b>SIAM Student Travel Award</b>	June 2021
Awarded a student travel grant to attend the SIAM Annual Meeting 2021.	\$650
<b>ICOSAHOM Conference Travel Grant</b>	July 2018
Awarded a student travel grant to attend the International Conference on Spectral And High Order Methods at Imperial College London.	\$2500
<b>Numerical Simulations ICNM 2017 Conference Travel Grant</b>	July 2017
Awarded full funding from HKUST for attending the 5th International Conference on Numerical Simulations for Multimaterial and Multiphysics Problems in China.	\$2200
<b>Advanced Research in Turbomachinery Summer School Grant</b>	July 2019
Received a scholarship to attend this summer school organized by the University of Florence, Italy and sponsored by ANSYS and GE.	€800
<b>MIT StartMIT Course Grant</b>	January 2019
Received full sponsorship from MIT Martin Trust Center to attend this hands-on MIT course on entrepreneurship involving multiple trips to companies within USA.	

<b>Fluid Dynamics across Scales Summer School Grant</b>	July 2018
Received full-funding from HKUST to attend the Centre for Doctoral Training in Fluid Dynamics across Scales at Imperial College London.	\$1000
<b>MIT Entrepreneurship and Maker Skills Integrator Bootcamp Funding</b>	June 2018
Received full funding from MIT and Hong Kong Innovation Node to attend the program involving trips to startup incubators in China.	

## COMMUNITY INVOLVEMENT

<b>Executive Secretary and Reviewer, Two NASA Proposal Review Panels</b> 	Jan 2023 – Present
Managing the panel review, assisting the group chief and reviewing the proposals in two panels.	\$1875+\$1490
<b>Young Professional Mentor, Zed Factor Fellowship Program</b> 	May 2023 - Present
Mentor rising undergraduate students in Aerospace Engineering.	
<b>Team Member, UT Austin Libraries HELIOS team</b> 	April 2023 - Present
To advance Higher Education Leadership Initiative for Open Scholarship (HELIOS). Gave a speech at <b>US White House</b> on Open Science (News  , Post  , Video  ).	
<b>Volunteer, MIT Energy Conference</b> 	April 2023
Helped with organizing the conference in person in Boston.	\$900
<b>Coordinator, Center for Planetary Systems Habitability Student Travel Award</b> 	Jan – Apr 2023
Organizing, coordinating and liaising the application process for student travel to LPSC 2023.	
<b>Exec. Board Member &amp; DEI Team Lead, US Assoc. of Polar Early Career Scientists</b> 	Sept 2022 – Present
Fostering climate and DEI-conscious collaborations between academia & polar organizations.	
<b>Member, AGU Hydrology Section Student Subcommittee (AGU-H3S)</b> 	Jan 2023 – Present
Providing professional development & networking opportunities to early career hydrologists.	
<b>MIT - Houston Energy Innovation Student Fellow</b> 	March 2022 – April 2023
Creating energy innovation ecosystem considering the threat of climate change.	
<b>Volunteer / Braindate Lounge Assistant, AGU Fall Meeting 2022</b> 	Dec 2022
Facilitated collaborations between researchers and scientists through Braindate at AGU 2022.	
<b>Mentor, American Geophys. Union Earth &amp; Planetary Surface Processes (EPSP)</b> 	Oct 2022 – Present
Mentoring graduate students across the world for developing technical and research skills in EPSP.	Virtual
<b>Geoscience Ambassador, Jackson School of Geosciences, UT Austin</b> 	Sept 2021 - Present
Making geoscience accessible to broader community & promoting interdisciplinary research.	Austin, USA
<b>Session Chair, Society for Industrial &amp; Applied Mathematics Annual Meeting 2021</b> 	July 2021
Chaired the “CP15: Machine Learning and Data Mining” Session.	Virtual
<b>President &amp; Senior Advisor, Soc. for Industrial &amp; Applied Math, Austin Chapter</b> 	Sept 2020 – Present
Spearheaded several programs & Won Best Graduate Organization at UT Austin Award.	Austin, USA
<b>Mentor, Mentoring365, American Geophysical Union</b> 	Aug 2021 – Present
Facilitating an exchange of professional knowledge, skills, and experiences in Earth and space sciences.	Virtual
<b>Mentor, SIAM Applied Mathematics Mentorship</b> 	Jan 2021 – Present
Conceptualized the program and mentoring UT students for applied math concepts and prospects.	Austin, USA
<b>Volunteer, Lunar and Planetary Science Conference 2022</b> 	March 2021
Managed a virtual and an in-person session and moreover conference logistical tasks.	Houston, USA
<b>Mentor, Sir Syed Global Scholar Award</b> 	Jan 2016 – Present
Mentoring top AMU students from humble backgrounds for US grad school applications.	Aligarh, India
<b>Vice-Chairperson, American Society of Mechanical Engineers, Aligarh Chapter</b> 	Sept 2014 – June 2016
Organized various events including paper presentation and annual technical festival.	Aligarh, India

**Zonal Head & College Head Ambassador, Smilyo Educational Charitable Society**  Jan 2014 – Jan 2015  
Managed multi-university teams & provided educational resources to not-so-privileged. New Delhi, India

**Senior Under Officer, National Cadet Corps, Govt. of India (Similar to ROTC)**  Jan 2013 – April 2015  
C certificate holder, best cadet, organized blood donation, awareness, & army camps Aligarh, India

## REVIEWER FOR TECHNICAL JOURNALS

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**Geoscience:** Computational Geoscience, Water Resources Research, Journal of Geophysical Research  
**Fluid Mechanics:** Journal of Fluid Mechanics, Physics of Fluids, Physical Review Fluids, Springer Nature  
**Numerical Methods:** Journal of Computational Physics, Computer and Fluids, Computer and Geotechnics

## SKILLS

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**Languages:** C, C++, Fortran 77/90, Python (SciPy, NumPy, Matplotlib, Pandas, Tensorflow, Tkinter), MATLAB, Mathematica, Shell Scripting,  $\LaTeX$ , High Performance Computing  
**Software:** AutoCAD, SolidWorks, ANSYS, Fluent, COMSOL Multiphysics, TecPlot, ParaView, CHEMKIN, COSILAB, Microsoft Office, Git, Travis CI, Docker, Hydrus, VPLANET  
**OS:** Linux, Windows, Mac

## STUDENT MEMBERSHIP

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American Geophysical Union  
Association of Polar Early Career Scientists  
Society for Industrial and Applied Mathematics  
American Physical Society

## PEER REVIEWED PUBLICATIONS

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**Shadab, M.A.,** Luo, D., Hiatt, E., Hiatt, E. and Hesse, M.A., 2023. Investigating Steady Unconfined Groundwater Flow using Physics Informed Neural Networks, *Advances in Water Resources*, Elsevier, 104445, ISSN 0309-1708, DOI: 10.1016/j.advwatres.2023.104445

**Shadab, M.A.** and Hesse, M.A., 2022. Analysis of gravity-driven infiltration with the development of a saturated region, *Water Resources Research* (AGU), DOI: 10.1029/2022WR032963

**Shadab, M.A.,** Balsara, D., Shyy, W. and Xu, K., 2019. Fifth order finite volume WENO in general orthogonally - curvilinear coordinates. *Computers & Fluids* (Elsevier), 190, pp.398-424.

**Shadab, M.A.,** Ji, X. and Xu, K., 2018. Fifth-order finite-volume WENO on cylindrical grids. *Spectral and High Order Methods for Partial Differential Equations* (Springer), p.637.

## UNDER REVIEW PUBLICATIONS

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**Shadab, M.A.,** Hiatt, E. and Hesse, M.A., 202X. Kochina (1962) solutions for steady unconfined groundwater flow: a free tool and its applicability. (under review in *SoftwareX*, Elsevier)

**Shadab, M.A.** and Hesse, M.A., 202X. A hyperbolic-elliptic PDE model and conservative numerical method for gravity-dominated variably-saturated groundwater flow. arXiv preprint arXiv:2210.04724. (under review in *Journal of Computational Physics*, Elsevier)













Hiatt, E. **Shadab, M.A.,** Hesse, M., Goudge, T., Gulick, S., 202X. Limited Recharge of a Deep Groundwater Aquifer In the Southern Highlands On Early Mars. (under review in *Icarus*, Elsevier)

Barnes, R., ... **Shadab, M.A.,** ..., 202X. The History and Habitability of the LP 890-9 Planetary System. *Planetary Science Journal*, American Astronomical Society. (under revision)

- Shadab, M.A.**, Hiatt, E., Bahia, R.S., Bohacek, E.V., Steinmann, V. and Hesse, M.A., 2023. Infiltration on early Mars and its implications toward aeolian-fluvial interactions. Fluvial-Aeolian Interactions on Planetary Surfaces (FAIRPLAY) workshop, European Space Agency.
- Shadab, M.A.**, Hiatt, E. and Hesse, M.A., 2023. A Deep Crustal Aquifer Model for Southern Highlands of Noachian Mars Shows Groundwater Age and Near-Surface Dynamics. NASA Exploration Science Forum 2023.
- Hiatt, E., **Shadab, M.A.**, et al, 2023. Limited Recharge of the Southern Highlands Aquifer on Early Mars. Texas Area Planetary Science Meeting (TAPS) 2023.
- Vance, S.D. Carnahan, E., **Shadab, M.A.**, Hesse, M.A., Silber, E.A., Crosta, A.P., 2023. Impact foundering and material transport through ice shells of various compositions. Impact Processes as a Path to Habitability of Planetary Habitability Workshop, Brazil.
- Shadab, M.A.**, Hiatt, E. and Hesse, M.A., 2023. A Deep Crustal Aquifer Model for Southern Highlands of Noachian Mars Shows Groundwater Age and Near-Surface Dynamics. Brines Across the Solar System: Ancient and Future Brines Conference 2023, Abstract #2025.
- Barnes, R., ... **Shadab, M.A.**,..., 2023. The History and Habitability of the LP 890-9 Planetary System. Biennial European Astrobiology Conference (BEACON) 2023.
- Shadab, M.A.**, Hiatt, E. and Hesse, M.A., 2023. Investigating groundwater dynamics and residence times on early Mars using unconfined aquifer model with vertical heterogeneity. 54th Lunar and Planetary Science Conference 2023, Abstract #1736.
- Hesse, M.A., **Shadab, M.A.** and Hiatt, E., 2023. Time scales for Terminal Groundwater Drainage from the Southern Highlands on Mars. 54th Lunar and Planetary Science Conference 2023, Abstract #1637.
- Hiatt, E., **Shadab, M.A.** and Hesse, M.A., 2023. Planetary Scale Groundwater and Surface Water Interaction on Early Mars. 54th Lunar and Planetary Science Conference 2023, Abstract #2415.
- Barnes, R., ... **Shadab, M.A.**,..., 2023. History and Habitability of the LP 890-9 Planetary System. 241st American Astronomical Society Meeting 2023.
- Shadab, M.A.**, and Hesse, M.A., 2022. An extended kinematic-wave theory for infiltration in soils with declining porosity causing delayed perching. 2022 American Geophysical Union (AGU) Fall Meeting.
- Shadab, M.A.**, and Hesse, M.A., 2022. Extending Richards equation to simulate variably saturated flows. 2022 AGU Fall Meeting.
- Hiatt, E. **Shadab, M.A.**, Hesse, M., Goudge, T., Gulick, S., 2022. Limited Recharge On Early Martian Aquifers: Numeric Analytic Recharge Rate Estimates As Constrained By Geomorphic and Geochemical Observations. 2022 AGU Fall Meeting.
- Shadab, M.A.**, Hiatt, E., and Hesse, M.A., 2022. Estimates of Martian mean recharge rates from analytic groundwater models. 53rd Lunar and Planetary Science Conference 2022, Abstract #1775.
- Hiatt, E., **Shadab, M.A.**, et al, 2022. Estimates of groundwater divides and basins on Noachian Mars. 53rd Lunar and Planetary Science Conference 2022, Abstract #2618.
- Shadab, M.A.**, Grima, C., Rutishauser, A., and Hesse, M.A., 2021. Analytical Solutions for Melt Percolation in Ice Masses and a Pathway to Ice Lens Formation. 2021 AGU Fall Meeting.
- Shadab, M.A.**, and Hesse, M.A., 2021. Fluid Infiltration in Unsaturated Porous Medium with The Development of a Saturated Region. 2021 AGU Fall Meeting.
- Hesse, M.A., **Shadab, M.A.**, Luo, D., Shen, Y., and Hiatt, E., 2021. Investigating Groundwater Flow Dynamics using Physics Informed Neural Networks (PINNs). 2021 AGU Fall Meeting.
- Hiatt, E., **Shadab, M.A.**, et al, 2021. Experimental and Numerical Investigation of Seepage Face Dynamics. 2021 AGU Fall Meeting.

- Hesse, M.A., **Shadab, M.A.**, Hiatt, E., Liebeck, J., 2021. Groundwater-ocean interaction on Mars. 2021 AGU Fall Meeting.
- Hiatt, E., **Shadab, M.A.**, et al, 2021. Numerical Modeling of the Formation of Hellas Planitia with Focus on Spatio-Temporal Scales Required for Hydrologic Equilibration. 2021 AGU Fall Meeting.
- Shadab, M.A.**, Luo, D., Shen, Y., Hiatt, E., and Hesse, M.A., 2021. Investigating fluid drainage from the edge of a porous reservoir using Physics Informed Neural Networks. 2021 SIAM Annual Meeting.
- Shadab, M.A.**, Divoux, T. and Bischofberger, I., 2020. Suppression of drop breakup in a viscoelastic bath. Bulletin of the American Physical Society.
- Hiatt, E., **Shadab, M.A.** et al., 2020. Groundwater filling times for large impact basins on early Mars and implications for the onset of post impact hydrothermal systems. American Geophysical Society 2020 Fall Meeting.
- Shadab, M.A.**, Ji, X. and Xu, K., 2018. Fifth-order finite-volume WENO on Cylindrical Grids: Flux Evaluation Using Riemann Solvers and Gas-kinetic Scheme. In International Conference on Spectral And High Order Methods (ICOSAHOM), Imperial College London.
- Shadab, M.A.**, and Xu, K., 2017. Fifth order finite volume WENO in orthogonally-curvilinear coordinates. In 5th International Conference on Numerical Simulations for Multimaterial and Multiphysics Problems.
- Shadab, M.A.** and Baig, M.F., 2017. Investigation and Control of Unstart Phenomenon in Scramjets. In 21st AIAA International Space Planes and Hypersonics Technologies Conference (p. 2298).

## MEDIA COVERAGE

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| <b>Fulfilling my NASA dream - Sir Syed Global Scholar Award Story of the Month</b>                                                                                                                                                                                                                                                                                                                                                                                                                                     | Aug 2022   |
| On my post-baccalaureate experience towards landing a graduate fellowship at NASA JPL.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |            |
| <b>Mars may have less water than previously estimated - Multiple news outlets</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | April 2022 |
| UT Austin Website (front cover)  ,  &  , Phys.org  , Times of India  , Bailey Universe  |            |
| <b>Outstanding Student Presentation Award at AGU 2021 - UT Austin</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                | April 2022 |
| For outstanding student presentation on Rainwater Infiltration in AGU Fall Meeting 2021.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |            |
| <b>CPSH Travel Grant Sends 11 Students to LPSC - UT Austin</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                         | March 2022 |
| For travel grant of \$1,000 from Center for Planetary Systems Habitability to attend LPSC 2022.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |            |
| <b>Lunar &amp; Planetary Institute Career Devel. Award News - UT Austin</b>  , <b>LPI News</b>                                                                                                                                                                                                                                                                                                                                  | Feb 2022   |
| For outstanding first-authored work on fate of water on early Mars submitted at LPSC conference.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |
| <b>How To Stay Productive While in Quarantine - Oden Institute Feature Article</b>                                                                                                                                                                                                                                                                                                                                                                                                                                   | March 2021 |
| For academic & research achievements and service at Oden Institute during quarantine.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |            |

## SOFTWARES

- Shadab, M.A.**, Hiatt, E., and Hesse, M.A., 2022. mashadab/polubarinova-kochina-solutions: P-k tool v1.1 (v1.1). Zenodo. <https://doi.org/10.5281/zenodo.74786522>
- Shadab, M.A.**, Luo, D., Shen, Y., Hiatt, E., and Hesse, M.A., 2021. PINNs for Unconfined Groundwater Flow (v1.0). Zenodo. <https://doi.org/10.5281/zenodo.5803542>
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