

# Levi D. McClenny

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**Citizenship:** USA

**DoD Clearance:** TS/SCI

## Summary

- Ph.D. in Electrical Engineering with an emphasis in Deep Learning
- Captain, Company Commander, Blackhawk pilot in the US Army Reserves

## Current Positions Held

Graduate Research Fellow, US Army Research Lab	May 2019 - Present
Company Commander, US Army Reserves	Nov 2020 - Present
UH-60 Blackhawk Pilot-in-Command	Sept 2020 - Present
Member, Texas Higher Education Coordinating Board	May 2020 - Present

## Research Interests

Physics-Informed Deep Learning, Machine Learning, Numerical Methods, Computer Vision

## Education

<b>Texas A&amp;M University</b>	College Station, TX
Ph.D. in Electrical Engineering	Aug 2017 – Present
Advisor: Dr. Ulisses Braga-Neto	
Certificates in <i>Materials, Informatics and Design</i> and <i>Statistics</i>	
MS in Electrical Engineering	May 2015 – Aug 2016
Advisor: Dr. Ulisses Braga-Neto	
Thesis: <i>Optimal State Estimation for Partially-Observed Boolean Dynamical Systems in the Presence of Correlated Observation Noise</i>	
BS in Electrical Engineering	Aug 2010 – May 2015
Advisor: Dr. Ulisses Braga-Neto <i>GPA: 3.54, Cum Laude</i>	

## Honors and Scholarships

ORAU Journeyman Fellowship (US Army Research Lab)	2019-2021
Data-Enabled Discovery of Energy Materials (D <sup>3</sup> EM) Fellowship (NSF DGE-1545403)	2017-2019
Graduate Research Fellow (NSF CCF-1320884)	2015-2016
Undergraduate Research Fellow (NSF CCF-1320884)	2015

## Awards

Center for Junior Officers 30 Under 30 Leader Developers (US Army)	2020
Air Assault School Distinguished Honor Graduate (US Army)	2018
Buck Weirus Spirit Award (Texas A&M University Student Affairs)	2017

## Journal Publications

[2] **Semi-supervised Learning Approaches to Class Assignment in Ambiguous Microstructures**

Courtney Kunselman, Vahid Attari, **Levi McClenny**, Ulisses Braga-Neto, and Raymundo Arroyave

*Acta Materialia*, Volume 188C, 49-62, 2020.

[1] **BoolFilter: an R package for estimation and identification of partially-observed Boolean dynamical systems**

**Levi D McClenny**, Mahdi Imani, Ulisses M Braga-Neto

*BMC Bioinformatics* 18, 519, 2017.

## Conference Publications

[2] **Self-Adaptive Physics-Informed Neural Networks using a Soft Attention Mechanism**

**Levi D. McClenny**, Ulisses Braga-Neto

*AAAI-MLPS 2021*.

[1] **Boolean Kalman Filter With Correlated Observation Noise**

**Levi D McClenny**, Mahdi Imani, Ulisses M Braga-Neto

*2017 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, 866-870, 2017

## Other Publications

**BoolFilter Package Vignette**

**Levi D. McClenny**, Mahdi Imani, Ulisses Braga-Neto

<https://cran.r-project.org/web/packages/BoolFilter/vignettes/BoolFilter.pdf>

## Preprints

**TensorDiffEq: Scalable Multi-GPU Forward and Inverse Solvers for Physics Informed Neural Networks**

**Levi D. McClenny**, Mulugeta A. Haile, Ulisses M. Braga-Neto

*arXiv preprint arXiv:2103.16034*

**Deep Multimodal Transfer-Learned Regression in Data-Poor Domains**

**Levi McClenny**, Mulugeta Haile, Vahid Attari, Brian Sadler, Ulisses Braga-Neto, Raymundo Arroyave

*arXiv preprint arXiv:2006.09310*

## Software

[2] **TensorDiffEq: Scalable Multi-GPU Forward and Inverse Solvers for Physics Informed Neural Networks**

**Levi McClenny**, Mulugeta A. Haile, Ulisses Braga-Neto

<https://github.com/tensordiffeq/TensorDiffEq>

<https://arxiv.org/abs/2103.16034>

Tags: *Python, Tensorflow, Multi-GPU*

[1] **BoolFilter: an R package for estimation and identification of partially-observed Boolean dynamical systems**

Levi D McClenny, Mahdi Imani, Ulisses M Braga-Neto

<https://github.com/levimcclenny/BoolFilter>

*BMC Bioinformatics* 18, 519, 2017.

Tags: R, POBDS, Optimal State Estimation, Genetic Regulatory Networks

Research Experience

Member/Co-Founder, **Scientific Machine Learning (SciML) Lab**

*Texas A&M University*

Mentors: Ulisses Braga-Neto, Raymundo Arroyave 2020 – Present

- Assisted in co-founding a dedicated Scientific Machine Learning Lab at Texas A&M, a subsidiary of the Texas A&M University Institute of Data Science
- Was the only graduate researcher granted *Member* status of the lab in its inaugural year
- Assisted in coordination of a speaker series including attendance of multiple high-profile speakers in the SML community, including Paris Perdikaris and Chris Rackaucas
- Created and continue to maintain the *TensorDiffEq* software suite
- Offered numerous workshops on SciML preliminaries and *TensorDiffEq*
- First author on multiple peer-reviewed publications regarding the training improvement and democratization of Physics-Informed Deep Learning

ORAU Journeyman, **Weapons and Materials Research Directorate**

*US Army CCDC Army Research Lab*

Mentor: Dr. Haile Mulugata 2019 – Present

- Working remote from the ARL-South campus in College Station, TX.
- Research engineer in the Weapons and Materials Research Directorate (WMRD) applying multi-GPU computer vision and deep-learning based generative models to microscale material images, bridging the gap between GPU-enabled deep learning and what we understand about material systems in the physical world
- Additional projects include: bringing domain expertise into a large-scale project for the Joint Artificial Intelligence Center (JAIC) involving analysis of over 27 TB of health monitoring system data for the H-60 platform - utilizing Nvidia's RAPIDS platform for bayesian methodologies as well as recurrent deep learning

Research Assistant, **Data-Enabled Discovery of Energy Materials (D<sup>3</sup>EM) Program**

*Texas A&M University*

Mentor: Dr. Ulisses Braga-Neto, Dr. Raymundo Arroyave 2017 – 2019

- Assisted in the authorship of one journal paper regarding machine learning applications in materials informatics

- Explored numerous application of deep learning in the materials informatics space, such as GANs, CNNs, PINNs, and RNNs

**Research Assistant, Genomic Signal Processing Lab**

*Texas A&M University*

Mentor: Dr. Ulisses Braga-Neto 2015 – 2016

- Authored one conference paper, one journal paper, as well as publications centered around the open-source R Package *BoolFilter* for optimal state estimation of Partially-Observed Boolean Dynamical Systems

**Teaching Experience**

**Teaching Assistant, Department of Electrical Engineering** Fall 2015

*Texas A&M University*

ECEN 447: Digital Image Processing

Directly responsible for grading and running Matlab sessions regarding standard image processing techniques at the senior and early graduate level

**Military Experience**

**US Army Reserves, 1-158 Assault Helicopter Battalion** Conroe, TX

*Company Commander*

Nov 2020 - Present

- Commander of a Forward Support Company (E/1-158 AHB), directly responsible for over 100 personnel and \$30+ million in Army assets
- Directly responsible for training, evaluation, metrics, and development of a TOE Army unit. Signature authority for all actions internal to the company and final approval authority for all ground and select aviation operations. Assumes all risk for day-to-day operations and significant training/operational events.
- Responsible for maintaining personal proficiency as a UH-60 Blackhawk pilot-in-command (PC) responsible for direct training of junior pilots in the battalion

*Flight Company Platoon Leader*

Aug 2017 - Nov 2020

- Directly responsible for almost 30 personnel and 5 aircraft, totaling approx. \$110 million in Army assets.
- Job requirements consist of maintaining flight minimums, training requirements, and professional military education while enabling other personnel in the platoon to do the same.

*Student, Basic Officers Leadership Course - Aviation*

May 2016 - Aug 2017

- Course consists of multiple phases spanning approximately 15 months. Includes courses in leadership development, small group management, and team building
- Phases include technical instruction on the operation and handling of piloting the UH-60 Blackhawk, including instrument and tactical flying procedures

*Platoon Leader* May 2015 - May 2016  
- Responsible for maintaining metrics and standards across the platoon, including physical fitness, additional duties, and military education

**Texas Army National Guard**, 442 Engineer Company (MAC) Angleton, TX  
*Squad Leader, Army ROTC Cadet* Mar 2011 - May 2015  
- Combat Engineer and SMP Cadet in the Texas Army National Guard. Attended 12B OSUT in May 2011.  
- Areas of expertise include squad level room clearing, route clearing, and basic demolitions.

### Talks and Tutorials

**Self-Adaptive Physics-Informed Neural Networks with a Soft Attention Mechanism** Mar 2021  
AAAI-MLPS 2021

**TensorDiffEq - a Scalable Solution for PINN Training** Mar 2021  
Texas A&M University HPRC SciML Workshop

### Skills

#### **Programming**

Proficient in: Python, Tensorflow, R

Familiar with: Matlab, C, C++, CUDA

Proficient in containerized applications using Docker

Strong understanding of multi-GPU development and parallel execution

#### **Languages**

English (fluent, native)

#### **Professional Certifications**

Tensorflow Developer Certificate

AWS Certified Cloud Practitioner

Nvidia - Fundamentals of Deep Learning for Computer Vision

Nvidia - Introduction to AI in the Data Center

#### **MOOCs**

LinkedIn - Strategic Thinking

Udemy - Beginning CUDA Programming

Coursera - Tensorflow Developer Certification

Leadership Roles  
and Advocacy

**Texas Higher Education Coordinating Board** May 2020 - May 2021

*Student Representative*

- The mission of the Texas Higher Education Coordinating Board (THECB) is to provide leadership and coordination for Texas higher education and to promote access, affordability, quality, success, and cost efficiency through 60x30TX, resulting in a globally competitive workforce that positions Texas as an international leader.
- Appointed by the Governor of Texas to advocate on behalf of the 1.8m students in institutions of higher education in the state of Texas. Responsible for advocating for affordability, experience, and quality of higher education institutions and organizations.

**Texas A&M University System Board of Regents** May 2019 - May 2020

*Student Regent*

- Appointed by the Governor of Texas to serve as the sole student member to the Texas A&M Board of Regents
- Responsible for advocating for 167,000 students across 11 campuses
- Directly provide oversight to the Texas A&M University System's budget of \$5 billion in revenue and expenditures, reviewing proposals as fit for the individual campuses in the system

**Texas A&M University Student Government** May 2015 - May 2016

*Executive Vice President*

- Responsible for stepping in for the Student Body President at a moment's notice and coordinating the efforts of the Student Government Executive Cabinet to align with the SBPs vision
- Sat on numerous university committees and boards, including Recreational Sports, Student Affairs Fee Advisory Board, Student Organization Funding Assistance Board, Campus Concealed Carry Task force, and others

Service and  
Outreach

**Aggies & Mentors** Spring 2021

*Co-Founder*

- Co-founded a student organization dedicated to partnering current Texas A&M Students with former student mentors
- Sat as one of the very first mentors in the program and continue to meet regularly with student leadership

**Texas A&M University Career Closet** Spring 2016

*Co-Founder*

- Co-founded a student organization dedicated to providing business professional clothing to students in need for job interviews and career fairs
- Assisted in the acquisition of approx. \$35,000 in initial funding to purchase an initial round of business professional clothing and renovations a the shared space for the organization

Professional memberships	Member, IEEE Signal Processing Society	Apr 2020 – Present
	Member, IEEE Computer Society	Apr 2020 – Present
	Member, Rice University’s Baker Institute of Public Policy	Jan 2021 – Present
	Member, Defense Entrepreneurs Forum	Mar 2021 – Present

Technical Reviews	Manning Publishing Company Technical Reviewer - Full book, book chapters, as well as LiveProject series reviews
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Other interests	Snowboarding, Traveling, Guitar, Private/Commercial Pilot
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