Eduardo Colmenares

Associate Professor | Computer Science Department
Midwestern State University
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EDUCATION

- **Ph.D. in Computer Science**
  Department of Computer Science, Texas Tech University,
  Lubbock, TX, 2014

- **Master of Science in Computer Science**
  Department of Computer Science, Texas Tech University,
  Lubbock, TX, 2008

- **Bachelor of Science in Electronic Engineering**
  Department of Electrical Engineering, Universidad Industrial de Santander,
  Bucaramanga, Colombia, 2000

PROFESSIONAL EXPERIENCE

Academia

Midwestern State University — Department of Computer Science
Assistant Professor — Wichita Falls, Texas
Fall 2015-**Present**

Texas Tech University — College of Engineering & Department of Computer Science
Instructor (Dual Appointment) — Lubbock, Texas
Spring 2015

Texas Tech University — College of Engineering
Teaching Assistant — Lubbock, Texas
Fall 2012-Spring 2015
Fall 2007-Spring 2008

Texas Tech University — Department of Computer Science
Research Assistant — Lubbock, Texas
Spring 2007

Teaching Responsibilities/Experience (Courses taught)
Midwestern State University

Spring 2024
- CMPS-4563-201 **&** CMPS 5433-201 Topics in Parallel and Distributed Computing: Parallel Programming (**Dual Listed**)
- CMPS 5153-(**201 & 202, two sections**) Advanced Software Engineering
- CMPS 2143-201 Object-Oriented Programming

Fall 2023
- CMPS-1063-101 Data Structures and Advanced Data Types
- CMPS-3013-101 Advanced Structures & Algorithms
- CMPS-5113-102 Advanced Programming Languages
- CMPS-6901-170 Individual Study in Computer Science

Summer 2023
- CMPS-5323-401 Grad Top CMPT: Numerical Analysis - Summer II
- CMPS-6901-401 Individual Study in Computer Science - Summer II

Spring 2023
- CMPS-1063-201 Data Structures and Advanced Data Types
- CMPS-4233-201 Artificial Intelligence
- CMPS-5153-201 Advanced Software Engineering

Fall 2022
- CMPS-4563-101/CMPS-5433-101 Topic HPC-Minor: GPU Programming (Dual Listed)
- CMPS-4453-101 Computer Architecture
- CMPS-3013-101 Advanced Structures & Algorithms

Summer I-2022
- CMPS-5433-301/CMPS-4553-301 Topics in Parallel and Distributed Systems: Deep Learning (Dual Listed)

Spring 2022
- CMPS-2143-201 Object-Oriented Programming
- CMPS-4563-201 Topics in Parallel and Distrib Computing: HPC
- CMPS-5153-201 Advanced (GR) Software Engineering

Fall 2021 (Assigned)
- CMPS-3013-101 Advanced Structures & Algorithms
- CMPS-4563-101 Topics in HPC-Minor: Parallel Programming
- CMPS-4993-X10 Individual Study in Computer Science
- CMPS-5133-101 Advanced Computer Architecture Fall
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Summer I-2021
- CMPS-5323-301 Topic CMPT: Numerical Analysis

Spring 2021
- CMPS-4113-201 Undergraduate Software Engineering
- CMPS-4233-201/CMPS-5323-201 Artificial Intelligence
- CMPS-5153-280 Advanced (GR) Software Engineering

Fall 2020
- CMPS-1063-102 Data Structures and Advanced Data Types
- CMPS-3013-101 Advanced Structures & Algorithms

- CMPS-4563-101 Top in HPCM:GPU Programming
- CMPS-5133-101 Advanced Computer Architecture

Summer I-2020
- CMPS 4553 X30 Topics in CMPT: Intro to Deep Learning (UG)

Spring 2020
- CMPS-1063-202 Data Structures and Advanced Data Types
- CMPS-4113-201 Software Engineering
- CMPS-4993-201 Individual Study in Computer Science
- CMPS-5433-201 Advanced Parallel Topics: GPU Programming (Graduate)

Fall 2019
- CMPS-1044-103 Computer Science I
- CMPS-4563-101 Topics ins HPC Minor: Parallel Programming
- CMPS-5133-101 Advanced Computer Architecture (GR)

Summer I- 2019
- CMPS-5323-301 Numerical Methods

Spring 2019
- CMPS-1063-201 Data Structures and Advanced Data Types
- CMPS-4113-201 Software Engineering
- CMPS-5433-201 Topics in Parallel and Distributed Systems: Deep Learning (GR)
- CMPS-4993-270 Ind Study in Computer Science (1 student)
- CMPS-5993-270 Ind Grad Study in Computer Sci (1 Student)

Fall 2018
- CMPS-1063-101 Data Structures and Advanced Data Types
- CMPS-4563-101 Parallel Topics: Deep Learning
- CMPS-5433-101 Advanced Topics: Parallel and Distributed Programming

Spring 2018
- CMPS-5143-201 Advanced Operating Systems
- CMPS-4563-201 GPU Programming
- CMPS-3023-201 Logic Design

Fall 2017
- CMPS-5433-101 Scientific Computing
- CMPS-4103-101 Introduction to Operating Systems

Summer II- 2017
- CMPS-5443-401 Advanced Topics: Real Time Systems

Spring 2017
- CMPS-1063-201 Data Structures and Advanced Data Types
- CMPS-4563-201 Parallel Topics: High Performance Computing (HPC)
- CMPS-5422-201 Advanced Parallel Topics: GPU Programming (Graduate)
- CMPS-6901-201 Graduate Research in Computer Science

Fall 2016
- CMPS-5133-101 Advanced Computer Architecture
- CMPS-4563-101 Advanced Parallel Topics: GPU Programming (undergraduate)
- CMPS-5113-170 Advanced Programming Languages
- CMPS-6901-180 Graduate Research in Computer Science

Summer I-2016
- CMPS-5323-301 Graduate Topics: Scientific Computing in C++, Unix

Spring 2016
- CMPS-5133-101 Advanced Computer Architecture
- CMPS-5113-170 Advanced Programming Languages Concepts
- CMPS-4563-101 Parallel Distributed Computing: GPU Programming

Summer I-2016
- CMPS-5323-301 Graduate Topics: Scientific Computing in C++, Unix

Spring 2016
- CMPS-5433-201 Advanced Topics: Parallel and Distributed Programming
- CMPS-1063-201 Data Structures and ADT
- CMPS-4113-201 Software Engineering (UG)

Fall 2015
- CMPS-5113-170 Advanced Programming Languages Concepts
- CMPS-4453-101 Computer Architecture (UG)
- CMPS-1063-101 Data Structures and ADT

Texas Tech University
Spring 2015
- Software Engineering I
- Introduction to Engineering

Fall 2012 to Fall 2014
- Introduction to Engineering.
  Directly responsible for the teaching and grading of ~100 students per semester.
  This class required clear understanding of mathematical, statistical and multi-disciplinary engineering concepts, as well as programming proficiency in Matlab.

Fall 2007
- Introduction to Computer Science
  Covered some lectures for faculty member while he was absent attending conferences.

Industry

Texas Tech University — Department of Chemical Engineering
IT Technician — Lubbock, Texas
August 2008 – May 2012
- Oversaw IT support for the entire department.
- Solved computer related problems for faculty members and research groups.
- Responsible for the purchasing of all IT related equipment.

Energy Solutions International † — Houston, Texas
Project Engineer — November 2002 - May 2006
- Responsible for the configuration of a real time and predictive leak detection model for several international oil clients, such as, Iroquois Gas (Shelton, Connecticut-USA), Ecopetrol (Colombian National Oil. Co), and PDVSA GAS (Venezuelan National Oil Co).
- In charge of documenting, and solving several of the problems for the leak detection systems, while on site and at headquarters.

- Acted as a company representative, and took care of all technical needs of the clients while deployed internationally.

Proyectos Integrales Ltd. † Bogota-Colombia
Project Engineer November 2002 - May 2006

- Got started with Phase I of the leak detection tracking system project for Ecopetrol, later completed in Houston, TX in partnership with Energy Solutions Intl.
- Successfully integrated the leak detection system with Ecopetrol's SCADA system
- Implemented code improvements to the GUI communications protocol, which required knowledge of numerical methods and C-programming.

Schlumberger Product Center Sugar Land, TX-USA
Electronic Engineering Intern June 2001 - June 2002

- DSP programming for an industrial magnetic resonance tool. The objective, to improve the calibration and decrease the signal/noise ratio of the tool.
- Implementation, automation, and documentation of multiple test for electronic cards. This required extensive use of NI-Labwindows/CVI, heavily based on C-programming.

† Energy Solutions International and Proyectos Integrales Ltd were business partners

RESEARCH PROFILE

Dr. Colmenares research interests include: High Performance Computing; Graphic Processing Units (GPUs) and Hybrid Parallel Programming; Parallel Scientific computing; Parallel and Distributed Systems; Deep Learning, Data Science and undergraduate Software Engineering. He is the director of the NVIDIA GPU Educational Center at Midwestern State University and founder of the High Performance Computing and Deep Learning Laboratory (HPC&DL Lab). He has supervised multiple research projects on these areas. Dr. Colmenares' research has been published in refereed journals and conferences (Please see "Research and Scholarly Activity, Publications").

Where are **some** of Dr. Colmenares' Former Students & Members of the HPC&DL Lab?
(As of 01/01/2024)

- Broday Walker (GR), Software Engineer at Lockheed Martin, Fort Worth, TX.
- Shady Boukhary (UG), Graphics Software Engineer at Apple, Orlando, FL.
- Anthony Enem (UG), Software Development Engineer at Amazon, Seattle, WA.
- Olayinka Soyinka (GR), Software Engineer at Microsoft, Seattle, WA.
- Ali Khalid (UG), Research Development Engineer at Quantlab, Houston, TX.
- Amy Knowles (GR), Teaching Faculty at the Department of Computer Science, at New Mexico Tech. Socorro, NM.
- Shemal Rathnasuriya (UG), PhD Student at University of Texas at Dallas, Richardson, TX.
- Dakota Wilson (GR), METECS and engineering and applied technology service provider for NASA, Houston, TX.

Former members of the HPC&DL have achieved several successful goals among those:
internships at places such as ArrayFire, National Institute of Health, and the prestigious Oak Ridge National Laboratory and one *Winner of the prestigious ACM SIGHPC Computational & Data Science Fellowship.*

† *The ACM SIGHPC Computational & Data Science Fellowship* is extremely competitive and prestigious**,** for example in 2021 **only 11 out of 200 students worldwide** were awarded the fellowship. The HPC&DL member first student in the history of Midwestern State University in receiving such a high honor.

RESEARCH AND SCHOLARLY ACTIVITY

Refereed Publications: While at Midwestern State University

a. With MSU Students

Fred Wu, Eduardo Colmenares, "*Unpacking the Bias Challenges of Deep Learning in Clinical Applications: A Critical Explorer of the Impact of Training*", PriMera Scientific Engineering, Volume 3 Issue 5 November 2023, DOI: 10.56831/PSEN-03-084, ISSN: 2834-2550

Dakota Wilson, Eduardo Colmenares, "*An Incremental Many & Multi-core adoption of the Mathematics behind the FFT and its Benefits: A case Study*", at PDPTA'23- The 29th Int'l Conference on Parallel and Distributed Processing Techniques and Applications. Published in IEEE CPS and presented in (July-2023), Las Vegas, Nevada. ". Acceptance rate (19%).

Caleb Sneath, Eduardo Colmenares, "*Comparative Sequential and Parallel Discrete Signal Convolution Algorithms: A Case Study*", at the Consortium for Computing Sciences in Colleges (CCSC) South Central Conference 2023, at Stephen F. Austin State University, Nacogdoches, Texas (03/31/23). Published in the Journal of Computing Sciences in Colleges.

Eduardo Colmenares, Heng Wu, "Accelerating Workload Processing with MPI for Porter's Stemming Algorithm," 2021 International Conference on Computational Science and Computational Intelligence (CSCI), 12-2021, pp. 1783-1787, doi: 10.1109/CSCI54926.2021.00337 Acceptance rate (16%).

Yujin Yoshimura, Eduardo Colmenares. "Novel Prime Finding Algorithm". The 27th International Conference on Parallel & Distributed Processing Techniques & Applications (PDPTA'21: July 26-29, 2021, Las Vegas, USA). Acceptance rate (17%).

Formulating the Correlation between Speech Recognition Tests and Word Recognition Test
Mai Trinh, Sarah Beaver, Eduardo Colmenares, The 7th International Conference on Biomedical Engineering & Sciences, (BIOENG'21: July 26-29, 2021, USA). Acceptance rate (18%).

Eduardo Colmenares, Yujin Yoshimura, Heng Wu. "A Gentle Introduction to Deep Learning". Conference tutorial/workshop The 2020 South Central Region Consortium for Computing Sciences in Colleges (CCSC:SC). Journal of Computing Sciences in Colleges. Volume 35, Number 7. ISSN 1937-4771. http://www.ccsc.org/publications/journals/SC2020.pdf. Acceptance rate (53%).

Shady Boukhary, Eduardo Colmenares. "Study, Analysis, and Acceleration of an N-Body Simulation Under Many-Core Environments Using an Object Oriented Approach". The 2019 International Conference on Computational Science and Computational Intelligence – Parallel and Distributed Computing Track (CSCI'19-ISPD, December 05-07, 2019, Las Vegas, USA). Acceptance rate (17%).

Shady Boukhary, Eduardo Colmenares. "A Clean Approach to Flutter Development through the Flutter Clean Architecture Package". The 2019 International Conference on Computational Science and Computational Intelligence-Software Engineering Track (CSCI'19-ISSE: December 05-07, 2019, Las Vegas, USA). Acceptance rate (17%).

Anthony Enem, Ali Khalid, Eduardo Colmenares. "Distributed Cache-Reduction Approach to DNA Sequencing Using a Greedy Algorithm for the Shortest Common Superstring". The 2018 International Conference on Computational Science and Computational Intelligence (CSCI'18) - Parallel & Distributed Computing track. Las Vegas, Nevada, 12/2018. Acceptance rate (19%).

Shady Boukhary, Eduardo Colmenares. "Evaluating the Benefits of Many-Core Programming Models with Scientific Kernels: A Case Study". The 2018 International Conference on Computational Science and Computational Intelligence (CSCI'18) - Parallel & Distributed Computing track. Las Vegas,

Nevada, 12/2018. Acceptance rate (19%).

Amy Knowles, Eduardo Colmenares. "Temperature Dispersion: Many-Core vs. Traditional Multi-Core Laplace Transform Implementation". The 23th International Conference on Parallel and Distributed Processing Techniques and Applications (PDPTA'17), Las Vegas, Nevada; 07/2017. ISBN: 1-60132-466-9 CSREA Press. Acceptance rate (26%).

Eduardo Colmenares, Amy Knowles. "A gentle introduction to GPU programming: conference tutorial/workshop The 2017 South Central Region Consortium for Computing Sciences in Colleges (CCSC:SC). Journal of Computing Sciences in Colleges. Fort Worth, Texas, 04/2017. ISSN: 1937-4771. Acceptance rate (50%).

b. With MSU Students and External Colleagues

Eduardo Colmenares, Heng Wu, Amy Knowles. "The Pedagogical Value and Importance of Applicable Computational Intensive Scientific Kernels in Parallel Computing: A Case Study". The 2017 South Central Region Consortium for Computing Sciences in Colleges (CCSC:SC). Journal of Computing Sciences in Colleges. Fort Worth, Texas, 04/2017. ISSN: 1937-4771. Acceptance rate (50%).

c. With MSU Colleagues

Bingyang Wei, Harry S. Delugach, Eduardo Colmenares, Catherine Stringfellow: A Conceptual Graphs Framework for Teaching UML Model-Based Requirements Acquisition. 2016 IEEE 29th International Conference on Software Engineering Education and Training (CSEET); 04/2016.

Eduardo Colmenares, Per Andersen, Bingyang Wei: An Overlap Study for Cluster Computing. The 2015 International Conference on Computational Science and Computational Intelligence (CSCI); Las Vegas, Nevada; 12/2015. Acceptance rate (25%).

d. With External Colleagues

Eduardo Colmenares, Heng Wu, "Accelerating Workload Processing with MPI for Porter's Stemming Algorithm," 2021 International Conference on Computational Science and Computational Intelligence (CSCI), 2021, pp. 1783-1787, doi: 10.1109/CSCI54926.2021.00337 Acceptance rate (16%).

Qinwen Zuo, Fred Wu* (Heng Wu), Fei Yan, Shaofei Lu, Colmenares-Diaz Eduardo, Junbin Liang. "Research on Efficient and Fuzzy Matching Algorithm in Information Dissemination System". The 19th International Conference on e-Learning, e-Business, Enterprise Information Systems, and e-Government (EEE'20). Jul 27-30, 2020. Las Vegas, Nevada; USA. Acceptance rate (18%).

Heng Wu*, Shaofei Lu, Colmenares-Diaz Eduardo, Junbin Liang, Jingke She, Xiaolin Tan. "Long Short Term Memory in Chemistry Dynamics Simulation". The 22nd International Conference on Artificial Intelligence (ICAI'20). July 27-30, 2020, Las Vegas, Nevada; USA. Acceptance rate (16%).

Fred Wu*, Colmenares-Diaz Eduardo, Poojitha Chapala, Tejaswi Jonnalagadda, Sailaja Peruka, Pooja Sonmale. "Long-Short Term Memory Neural Network on the Trajectory Computing of Directly Dynamics Simulation". The 18th International Conference on Scientific Computing (CSC'20). July 27-30, 2020, Las Vegas, Nevada; USA, Acceptance rate (16%).

H. Neeman, H. M. Al-Azzawi, A. Bergstrom, Z. K. Braiterman, D. Brunson, D. Colbry, E. Colmenares, A. N. Fuller, S. Gesing, M. Kalyvaki, C. Mizumoto, J. Park, A. Z. Schwartz, J. L. Simms and R. Vania, 2018: "Progress Update on the Development and Implementation of the Advanced Cyberinfrastructure Research & Education Facilitators Virtual Residency Program." Proc. PEARC'18, paper 71. DOI: 10.1145/3219104.3219117. Acceptance rate (64%).

Shao-fei Lu, Heng Wu, Eduardo Colmenares, Xu-chong Liu. "Evaluating accuracy of Hessian-based predictor-corrector integrators" Journal of Central South University (7/1/2017) 24: 1696. Springer, https://doi.org/10.1007/s11771-017-3576-8

Heng Wu, Shaofei Lu, Qinwen Zuo, Eduardo Colmenares. "A High Accuracy Computing Reduction Algorithm Based on Data Reuse for Direct Dynamics Simulations". The 2016 International Conference on Computational Science and Computational Intelligence (CSCI). Las Vegas, Nevada; 12/2016. DOI: 10.1109/CSCI.2016.0234. Acceptance rate (23%).

Heng Wu, Shaofei Lu, Ningjia Zhu, Jialiu Liu, Eduardo Colmenares, Yin Lu: "A high order predictor–corrector integration algorithm for first principle chemical dynamics simulations". Journal of Theoretical and Computational Chemistry 02/2016; 15(1). DOI:10.1142/S0219633616500036

Eduardo Colmenares, Per Andersen, Yu Zhuang: A Computational Reordered Algorithm with Overlapping of Communication and Computation for the All Pairs Shortest Path Problem in Distributed Memory Environments. The 22nd International Conference on Parallel and Distributed Processing Techniques and Applications (PDPTA'16), Las Vegas, Nevada; 07/2016. Acceptance rate (24%).

Eduardo A Colmenares, Per Andersen: A Data Communication Reliabilty and Trustability Study for Cluster Computing. The 21st International Conference on Parallel and Distributed Processing Techniques and Applications (PDPTA'15), Las Vegas Nevada; 07/2015. Acceptance rate (29%).

Refereed Publications: Before coming to Midwestern State University

Eduardo A Colmenares, Yu Zhuang: Maximizing Hardware Performance via Non-blocking Collective Communication for All Pairs Shortest Paths Computation on Heterogeneous Multi-core Processors. The 20th International Conference on Parallel and Distributed Processing Techniques and Applications (PDPTA'14); 07/2014. Acceptance rate (28%).

E. Colmenares, P. Andersen: Parallel computing and its potential benefits: A complex radix-2 FFT case study. The 8th International Multi-Conference on Society, Cybernetics and Informatics: IMSCI 2014, 07/2014. Acceptance rate (51.29%).

Heng Wu, Jianxin Wang, Xuchong Liu, Eduardo Colmenares, Guofeng Yan. "The Time Accuracy Analysis of Crank-Nicolson Predictor-Corrector Numerical Scheme for Diffusion Equations". International Journal on Numerical and Analytical Methods in Engineering (I.R.E.N.A.), 04/2013, Vol. 1, N. 2. ISSN 2281-7026.

P. Andersen, S. Andersen, E. Youngblood, E. Colmenares: Health education kiosk for low-literacy patients served by community-based clinics. Technology and Society, 2008. ISTAS 2008. IEEE International Symposium on Technology and Society; 07/2008.

FUNDING

External Grants

APPROVED

1) National Science Foundation (NSF) Grant #1: **Participating as Senior Personnel**.
CyberTraining: Pilot: A Professional Development and Certification Program for Cyberinfrastructure Facilitators. This grant proposal is an interinstitutional effort.
Seeking $299,993.
Submitted: 05/12/2021. **Approved** (09/01/2021) until (09/01/2023 "Estimated")
PI: H. Neeman (OU);
Co-PIs: Dana Brunson (Internet2), Dirk Colbry (Michigan State U)
Sr Personnel: Hussein Al-Azzawi (U New Mexico), Izzat Alsmadi (Texas A&M U San Antonio), Williams Burke (George Washington U), Sangwhan Cha (Harrisburg U of Science & Technology), Patrick Clemins (U Vermont), Galen Collier (Rutgers U), **Eduardo Colmenares-Diaz (Midwestern State U)**, Bev Corwin (consultant), Lizanne DeStefano (Georgia Tech, evaluator), Calvin Frye (Case Western Reserve U), Sandra Gesing (U Notre Dame), Joshua Gyllinsky (U Rhode Island), Anna Klimaszewski-Patterson (California State U Sacramento), Scott Lathrop (Shodor), Mariofanna Milanova (U Arkansas Little Rock), Sarhan Musa (Prairie View A&M U), Arman Pazouki (Northwestern U), Joy Pine-Thomas (U North Carolina Greensboro), Lorna Rivera (Georgia Tech, evaluator), Shervin Sammak (U Pittsburgh), Anita Schwartz (U Delaware), Horst Severini (OU), Jifu Tan (Northern Illinois U), Stephen Wheat (Oral Roberts U), Mengjun Xie (U Tennessee Chattanooga), Nuyun (Nellie) Zhang (Georgia Tech)

2) NVIDIA Education Center
Principal Investigator (**PI**). Thanks to this grant, Midwestern State University was named a GPU Education Center by NVIDIA, a $10.729 Billion-revenue computer technology company (as of April 2019) that has pioneered GPU-accelerated computing. Primary benefits of the grant are academic recognition, the donation of equipment from NVIDIA (one Tesla K40 & two Titan X GPUs), inclusion in GPU Educators program, books, course materials, hardware discounts & identification as a recognized GPU Education Center worldwide. GPU computing accelerates analysis & applications through parallel computing, & brings students & faculty into a higher level of computing in their classes & research. Having the support of NVIDIA gives us opportunities for further improvements to computing resources and strengthens our institutional reputation.
Submitted: 04/03/2016. **Approved** on April 26, 2016.
Estimated value: **$3753.8 (just the hardware and books)**

3) Texas Advanced Computing Center (TACC): Allocation Time
Principal Investigator (**PI**). Thanks to this grant, for the very first time, MSU gained access to two of the fastest supercomputers (Stampede and Maverick) and the largest academic research oriented cluster in the country. Thanks to this grant, access to this multi-million dollar innovative technology poses **no cost for MSU**. In addition to providing access to multi-million dollar innovative technology, this grant facilitated the immediate creation of new courses, and the redesign of already existing ones. Finally yet importantly, this grant allowed the creation of a new line of research at MSU "High Performance Computing".
Submitted: 1st time in 2016. **Approved.**
Successfully renewed annually, and currently valid until June 2024.

FUNDING

Internal MSU Grants

APPROVED

Intramural Grants

1) MSU–Intramural Grants: "Dalquest Desert Research Station as a natural laboratory to explore tree hybridization". This grant is and interdisciplinary effort.
   Dr. Antonio Castilla (Biology) is the Principal Investigator (**PI**)
   Dr. Colmenares (Computer Science) serves as **Research Collaborator.** In charge of the high performance computing (HPC) component of this research.
   Total Award: **$5000.**
   Submitted: Fall 2022. **Approved** on November 15, 2022.

2) MSU–Intramural Grants: "A Multi-GPU High Performance Computing Workstation to Advance Research and Science at MSU".
   Principal Investigator (**PI**). This grant contributed with a total of **$7,490,** of which, $2495 were used to fund a research student (wages), the remaining $4995 were used towards the purchasing of specialized HPC equipment.
   Submitted: Fall 2021. **Approved** on December 1, 2021.

3) MSU–Intramural Grants
   Principal Investigator (**PI**). This grant contributed with a total of **$7,128.83**. This money was combined with additional resources, and used towards the purchasing of "Turing", an academic HPC cluster, capable of providing an enhanced and up-to-date HPC experience to multiple departments campus wise.
   Submitted: 09/08/2015. **Approved** on October 9, 2015.

UGROW

1) MSU-UGROW Grant: Autonomous Collaborative Drones – Air and Ground-based Network – **Phase 2**.
   Students: Sharome Burton. **$2000.**
   Submitted: Spring 2022. **Approved** on August 11, 2022.

2) MSU-UGROW Grant: Artificial Intelligence and Deep Learning Framework Study.
   Students: Raul Orta. **$2000.**
   Submitted: Spring 2022. **Approved** on April 25, 2022.

3) MSU-UGROW Grant: Autonomous Collaborative Drones – Air and Ground-based Network – **Phase 1**.
   Students: Sharome Burton, Shanae Edwards. **$3000.**
   Submitted: Fall 2021. **Approved** on January 7, 2022.

4) MSU-UGROW Grant: Assembly, Setup and Testing of an Autonomous Robot Based on Jetson Nano.
   Students: David Hawkins & Micah-Lyn Scotland. **$3000.**
   Submitted: Spring 2021. **Approved** on April 9, 2021.

5) MSU- UGROW Grant: Multi-GPU Programming Pros and Cons. A case Study.
   Student: Ravishka Rathnasuriya. **$2000.**
   Submitted: Spring 2020. **Approved** on May 15, 2020.

6) MSU-UGROW Grant: Improving a GPU Fast Fourier Transform performance through the use of Visual Profilers.
Student: Sharome Burton. **$2000.**
Submitted: Spring 2020. **Approved** on May 15, 2020.

EURECA

1) MSU-EURECA Grant: *A Novel Prime Number Finding Algorithm*.
Student: Yujin Yoshimura. **$1600.**
Submitted: Fall 2019. **Approved** on January 17, 2020.

2) MSU-EURECA Grant: "A Smart Early Threat Detection System".
Student: Shady Boukhary. **$1600.**
Submitted: Spring 2019. **Approved** on August 15, 2019 **For One Whole Year**.

3) MSU-EURECA Grant: "Study, Analysis and Acceleration of a N-Body Simulation under Many-Core Environments".
Student: Shady Boukhary. **$1600.**
Submitted: Fall 2018. **Approved** on January 8, 2019.

4) MSU-EURECA Grant: "Parallel DNA Sequencing with BOOSTMPI and Efficient Memory Cache".
Students: Anthony Enem, Ali Khalid. **$3100.**
Submitted: Fall 2017. **Approved** on January 5, 2018.

5) MSU-EURECA Grant: "Parallel Computing Approach to DNA Sequencing". Students: Anthony Enem, Ali Khalid**. $2763.64**.
Submitted: Spring 2017**. Approved** on September 5, 2017.

MCOSME Faculty Development & Research Grants

1) MSU–MCOSME Faculty Development Funds- Fall 2022
Attend and present research paper "*Comparative Sequential and Parallel Discrete Signal Convolution Algorithms: a Case Study*" at Consortium on Computing Sciences in Colleges (CCSC) conference Stephen F. Austin University, Nacogdoches, TX, March 30-April 1, 2023.
$642.91 (Faculty travel).
Submitted: September 29, 2022. **Approved** on October 3, 2022

2) MSU–MCOSME Faculty Development Funds- Fall 2021
Attend and Present research paper "*Accelerating Workload Processing with MPI for Porter's Stemming Algorithm"* at the 2021 International Conference on Computational Science and Computational Intelligence (CSCI) Las Vegas, Nevada, December 15-17.
$675 (Faculty travel).
Approved: November 16, 2021.

3) MSU-MCOSME Research Grant
Principal Investigator (PI). This grant is related to graduate and undergraduate research. The objective was to acquire a hardware platform that would allow current and future students to learn about scientific kernels in two of the most dominant operating systems (Windows and Ubuntu). The grant supported the purchasing of the necessary equipment for the study. **$1299**.
Submitted: 11/16/2016. **Approved** on December 2, 2016.

PRESENTATIONS

One (1) MSU Faculty Forum

"Bringing High Performance Computing Awareness to the MSU community". MSU Faculty Forum. Wichita Falls, Texas, January 23, 2018.

Seven (7) Invited Talks

- "Colmenares' HPC&DL Lab Research Presentation". New Mexico Tech – Computer Science Graduate Seminar Series. Socorro, New Mexico. Fall 2022 (Exact Date TBD)
- "Study, Analysis and Acceleration of an N-Body Simulation under Many-Core Environments". at the High Performance Supercomputing Symposium, at the University of Oklahoma. Along with undergraduate CMPS student Shady Boukhary. Norman, Oklahoma, September 24, 2019.
- "Scientific Kernel Performance Evaluation under CUDA and OpenACC: A Case Study" at the High Performance Supercomputing Symposium, at the University of Oklahoma. Along with undergraduate CMPS student Shady Boukhary. Norman, Oklahoma, September 26, 2018.
- "An Introduction to Message Passing Interface (MPI)". High Performance Computing Research Seminar at Midwestern State University. Wichita Falls, Texas. March 6, 2017.
- "Non-Blocking and Blocking MPI instructions". High Performance Computing Research Seminar at Midwestern State University. Wichita Falls, Texas. March 13, 2017.
- "Maximizing Hardware Performance via Non-blocking Collective Communication for All Pairs Shortest Paths Computation on Heterogeneous Multi-core Processors", Oklahoma State University, Computer Science Colloquia Series, Stillwater, OK, October 8, 2015.
- "A Data Communication Reliability and Trustability Study for Cluster Computing". High Performance Supercomputing Symposium at the University of Oklahoma. Norman, OK, September 22, 2015.

Six (6) Conference Presentation – While at MSU

- "Accelerating Workload Processing with MPI for Porter's Stemming Algorithm," The 2021 International Conference on Computational Science and Computational Intelligence (CSCI), 2021, Las Vegas, Nevada; December 2021. Acceptance rate (16%).
- "A Gentle Introduction to Deep Learning". **Workshop**. At the 2020 South Central Region Consortium for Computing Sciences in Colleges Conference (CCSC: SC), at the University of Texas at Dallas (UTD), Richardson, Texas, April 3, 2020.
- "A Gentle Introduction to GPU Programming". **Workshop**. At the 2017 South Central Region Consortium for Computing Sciences in Colleges Conference (CCSC: SC), at Texas Christian University in Fort Worth, Texas, April 7, 2017.

- "The Pedagogical Value and Importance of Applicable Computational Intensive Scientific Kernels in Parallel Computing: A Case Study". The 2017 South Central Region Consortium for Computing Sciences in Colleges (CCSC: SC). Journal of Computing Sciences in Colleges. Fort Worth, Texas, April 7, 2017. Acceptance rate (50%).

- "A Computational Reordered Algorithm with Overlapping of Communication and Computation for the All Pairs Shortest Path Problem in Distributed Memory Environments". The 22nd International Conference on Parallel and Distributed Processing Techniques and Applications (PDPTA'16), Las Vegas, Nevada; July 2016. Acceptance rate (24%).

- "An Overlap Study for Cluster Computing". The 2015 International Conference on Computational Science and Computational Intelligence (CSCI); Las Vegas, Nevada; December 2015. Acceptance rate (25%).

Four (4) Conference Presentations - Before MSU

- "A Data Communication Reliabilty and Trustability Study for Cluster Computing". The 21st International Conference on Parallel and Distributed Processing Techniques and Applications, Las Vegas Nevada; 07/2015. Acceptance rate (29%)

- "Maximizing Hardware Performance via Non-blocking Collective Communication for All Pairs Shortest Paths Computation on Heterogeneous Multi-core Processors". The 20th International Conference on Parallel and Distributed Processing Techniques and Applications (PDPTA'14); 07/2014. Acceptance rate (28%)

- "Parallel computing and its potential benefits: A complex radix-2 FFT case study". The 8th International Multi-Conference on Society, Cybernetics and Informatics: IMSCI 2014, 07/2014. Acceptance rate 51.29%)

- "A Novel All Pairs Shortest Path Algorithm for Heterogeneous Multi-Core Architectures", presented at the North Texas Area Student Conference, Wichita Falls, TX, 2014

Other Presentations

- Workshop Title: Programming Many-Core Architectures (GPUs) using CUDA. The 2023 South Central Region Consortium for Computing Sciences in Colleges (CCSC:SC). Nacogdoches, Texas, March 32, 2023.

- Workshop Title: Scratch and Minecraft Programming. Summer I-2022 Young Engineer Summer (YES) Day Camp Workshop. Midwestern State University, Wichita Falls, Texas, June 20, 2022.

- Workshop Title: A Friendly Introduction to Python Programing. Summer I-2021 Young Engineer Summer (YES) Day Camp Workshop. Midwestern State University, Wichita Falls, Texas, June 25th, 2021.

- Workshop Title: A Gentle Introduction to Neuronal Networks and Associated Concepts. Summer I-2021 UGROW Workshop. Midwestern State University, Wichita Falls, Texas, May 26th, 2021.

- "A Friendly Introduction to Graphics Processing Units & Their Impact in Science". The

Summer I-2020 UGROW Workshop. Midwestern State University, Wichita Falls, Texas, May 28, 2020

- "Multiprocessing and Pthread Programming Explained". The Spring 2020 Eureka Workshop. Midwestern State University, Wichita Falls, Texas.

- STEM Activity day at Cunningham School. Gave talk and explained the insides and different components that conform a computer to elementary school students, February 15, 2019.

- Invited Speaker to Dr. Nelson Passos' Computer Architecture Class. Topic: "High Performance Computing Clusters and its Benefits", February 5, 2019.

- "An Introduction to Parallel Programming with MPI". The Fall 2017 Eureka Workshop, October 12, 2017.

- Presented my line of research during an ACM Meeting (at the request of the ACM president), October 11, 2017.

SERVICE

UNIVERSITY SERVICES

University Committees

- Faculty Senate. (1st Appointment Fall 2019, 2nd Appointment Fall 2022).
- College Tenure and Promotion Committee (Appointed Fall 2022)
- College Research Committee (Appointed Fall 2022).
- Financial Aid Appeals Committee (Appointed in Fall 2021)
- Traffic Appeals Committee (Appointed in Fall 2021)
- University Research Committee (Appointed in Fall 2017, for 2 years).
- Faculty Forum Committee (Appointed in Fall 2016, for 2 years).
- MCOSME Research Committee (Appointed in Fall 2017).

Faculty Mentoring

- Dr. Antonio Castilla Alvarez. Biology. Mentorship, 2022-2023.
- Dr. Pranaya Pokharel. Mechanical Engineering. Mentorship 2019-2020.
- Dr. Zeki Ilhan. Mechanical Engineering. Mentorship 2018-2019.

CS Faculty Search Committee (Faculty Recruitment).

- Participated of four faculty search committees
    - Fall 2018
    - Spring and Summer of 2019,
    - Spring 2022 (**Chair**)
    - Spring 2024.

Curriculum Development

- CMPS Core Committee member for two consecutive semesters, Fall 2016 and Spring 2017.
- Designed and proposed a minor in High Performance Computing. Approved in 2018.

Computer Science Scholarship Committee.

- Duties include approving candidates (students) for scholarships, based on merits and performance. A member during the 2018-2019 academic year.
- Volunteered as the **new chair** of the committee (effectivefrom Fall 2019-until the end of Spring 2023).

Mustang Rally. I have participated in this event **annually** since 2016.

Collection, Analysis and Reporting of Information in Connection with Assessment

- CMPS-3013-101 Advanced Structures & Algorithms, Fall 2021 & 2022.
- CMPS-2143-201 Object-Oriented Programming, Spring 2022.
- CMPS “Software Engineering”. Spring 2021
- CMPS 4113 “Software Engineering”. Spring 2019.
- CMPS 1063 “Data Structures and Advanced Data Types”, Fall 2018 & Spring 2019.

Student Recruitment

- CMPS Recruiting presentation, at McCoy School of Mechanical Engineering, Fall 2017, and Spring 2019.

- Attended the Spring 2019 College and Career Fair, and represented MSU, as well as the department of Computer Science. Talked to interested students and parents about our major and minors, April 23, 2019.

- Represented McCoy College of Science, Mathematics and Engineering during the MSU Transfer Day. Answered multiple questions to students and parents about the different CS programs that the MCOSME has to offer, April 1st, 2016.

Undergraduate and Graduate Instructional Programs

- The Oklahoma Supercomputing Symposium
  Supervised a group of students, departing from WF at 5:00 am, to the Oklahoma High Performance Supercomputing Symposium at the University of Oklahoma. Norman, OK, September of 2015, 2017, 2018, 2019, 2020.

- ACM Programming Contest
  I have served as assistant coach for a group of six undergraduate students, while attending the annual ACM ICPC South Central USA Regional Programming Contest during November of 2015, 2016, 2017 and 2018.

Administration of Computational Resources

- Coordinated with PSSC-Labs each one of the steps that led to the successful purchasing and deployment of "Turing", CS High Performance Computing Cluster.

- System Administrator for Turing since 2016. I assist interested students & faculty campus wide with the proper use of system, and created accounts for research and teaching purposes.

Math/Computer Science Annual Barbeque

- I have been actively involved with this event during 2016, 2017, 2018, and 2019. Served as the Master of Ceremonies in May 5, 2017.

Volunteered to create, supervise and host a one-hour weekly High Performance Computing seminar (Spring 2017). It provided an open space in which faculty and students across campus shared their research, ideas and future projects that may benefit from HPC capabilities.

PROFESSION

Member & Publicity Chair for the Consortium for Computing Sciences in Colleges-South Central (CCSC-SC). Duties include: the design of the Call For Papers (CFP), the periodic advertisement of the CFP, to maintain a list of more than 800 potential participants, and others as specified by the chair of the committee. **April 2016 to April 2024**.

Reviewed multiple paper submissions for the Consortium for Computing Sciences in Colleges-South Central (CCSC-SC). Two papers to Three per year for the **2016**, **2017**, **2018**, **2019, 2020, 2021, 2022, 2023 and 2024** conferences.

Director of the NVIDIA GPU Educational Center for MSU, Fall 2015- **Present**.

Director and founder of the High Performance Computing and Deep Learning Lab (HPC&DL Lab), Fall 2015-**Present**.

Served as Teaching Assistant (TA) during the 2018 Graphical Processing Unit Technological Conference at Washington DC (GTC-DC'18) for NVIDIA (a $10.729 Billion dollar revenue company, as of April 30, 2019). This waived the registration cost for MSU. Washington, DC, October 22-October 24, 2018.

Reviewed three articles for the 2018 Special Interest Group of Computer Science Education (SIGCSE' 2018 & 2020).

Moderated a full session during the 2017 Consortium of Computing Sciences in Colleges South Central Region (CCSC: SCC). Texas Cristian University, Fort Worth, TX, April 7, 2017.

Served as moderator for the Consortium of Computing Sciences South Central Conference (CCSC: SC). St. Edward's University, Austin, TX, April 9, 2016.

Served as a session chair during the 2015 International Conference on Computational Science and Computational Intelligence (CSCI –ISPD '15). Las Vegas, Nevada, December 7-9, 2015.

Served as session moderator during MSU events, such as EURECA, and Celebration of Scholarship.

Volunteered to create, supervise and host a one-hour weekly High Performance Computing seminar (Spring 2017). It provided an open space in which faculty and students from different majors across campus shared their research, ideas and future projects that may benefit from HPC capabilities.

Member of Upsilon Pi Epsilon (UPE) at MSU.

COMMUNITY

Member of the Language Proficiency Assessment Committee (LPAC) at **Fowler Elementary School**, Wichita Falls, Texas **since Spring 2023**.
Objective: to discuss and enter new ELLs (English Language Learners) into the ESL program.

Member of the Language Proficiency Assessment Committee (LPAC) at **Rider High School**, Wichita Falls, Texas during **Spring 2023**.
Objective: to discuss and enter new ELLs (English Language Learners) into the ESL program

Presenter at the Young Engineer Summer (YES) Day Camp Workshop. Midwestern State University, Wichita Falls, Texas, June **2021/2022**. This event introduces young members of the community to the benefits of understanding, learning and practicing science.

The **2019/2021/2022/2023** Northwest Texas Council (NWTC) Merit Badge College (MBC) day at MSU campus. This community-oriented event provides boy-scouts with a variety of opportunities that will help them to increase their merit badge count. I educated the young audience about different programming languages, freeware, open source, commercial software, computer related vocabulary, the history of computers, and career opportunities in programming for the Programming Merit Badge. March of calendar year.

STEM Activity day at Cunningham School. Gave a talk, and explained the insides and different components that make up a computer to elementary school students, February 15, 2019.

2017-TAME. Provided scientific explanations to high school students during the Texas Alliance for Minorities in Engineering (TAME) Trailblazer event on March 9, 2017 at the Region 9 Education

Service Center.

TCEA Robotics Competition (January of **2016**, **2017, 2019, 2022**). Duties include corresponding with TCEA representative before and on the day of the event. Judging inventions of area junior high and high school students through the use of a rubric and working with other judges to determine winners.

MSU Great Day of Service. Packed more than 450 meals at the Wichita Falls Area Food Bank, April 14, 2018.

The 2019 Steam Fair at WFISD Career Education. Volunteered to serve as a Judge for this event. Duties included the judging and grading of research oriented projects for middle, and high school students, January 24, 2019.

Annual Math, Science & U Conference for area junior high girls (**2018, 2019 & 2022**). This is a community-oriented event that takes place at MSU, its purpose is to show and inspire young girls about the potential and possibilities of a career in Math and Science. My duties included the preparation of all attendant gift and info bags, as well as placing of signs for the conference.

Sikes Lake Cleanup (**2015** and **2016**). Garbage collection around Sikes Lake. The goal, to protect the wildlife, maintain a clean and enjoyable environment, and help to keep Texas beautiful.

Volunteered to help the MSU Environmental Student Organization. Their mission as defined in their website "*The Environmental Student Organization enlightens the community and organizes the MSU Texas student effort in responsible environmental practices. They generate, implement, and maintain green initiatives on campus and beyond"*. We picked up trash from a Hamilton Park (Wichita Falls) for around 6 hours, October 6, 2018.

Big Blue Summer Computing Institute at Dexter Learning. Supervised and advised a group of students during the event. This event took place at Big Blue, in Downtown Wichita Falls, Texas. May 10, 2018.

AWARDS AND HONORS

At MSU Texas

- MCOSME Research Award — Spring 2022
- Nominated to the McCoy College of Science, Mathematics & Engineering Research Award at MSU — Spring 2021
- Nominated to the McCoy College of Science, Mathematics & Engineering Teaching Award at MSU — Spring 2020
- Nominated to the McCoy College of Science, Mathematics & Engineering Research Award at MSU — Spring 2020

At Texas Tech University

- Presidential Excellence Scholarship — Fall 2014
- TTU Summer Dissertation/Thesis Research Award Summer 2014 — July 2014
- 2nd Place in Engineering at the Annual TTU Graduate Poster Competition — Spring 2014
- Presidential Excellence Scholarship — Fall 2013
- Presidential Excellence Scholarship — Spring 2013
- Match T Fuller Scholarship — Fall 2012
- Presidential Excellence Scholarship — Fall 2012
- 3rd Place in Engineering at the Annual TTU Graduate Poster Competition — Spring 2012
- TTU General University FA Scholarship — Spring 2012
- TTU Employees Departmental Graduate Scholarship — Fall 2011
- Texas Tech Health Science Center -Research Scholarship — 2007