Aaron E. Tallman, PhD.

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Department of Mechanical and Materials Engineering   atallman@fiu.edu

Florida International University, Miami, FL   U.S. Citizen

EMPLOYMENT RECORD AT FIU

Assistant Professor   **Aug. 2021-Present**

FACULTY ACADEMIC EXPERIENCE

Assistant Professor of Mechanical and Materials Engineering, FIU   **Aug. 2021-Present**

NON-ACADEMIC EXPERIENCE

Los Alamos National Laboratory – Postdoctoral Research Associate   **Aug. 2018- Aug. 2021**

EDUCATION

Georgia Institute of Technology | Atlanta, GA Materials Science and Engineering   **PhD 2018**

   Dissertation: Hierarchical multiscale materials modeling: Calibration, uncertainty quantification, and decision support

Georgia Institute of Technology | Atlanta, GA Materials Science and Engineering   **M.S. 2015**

Rice University | Houston, TX   **Materials Science and Engineering**   **B.S. 2012**

Rice University | Houston, TX   **Visual and Dramatic Arts**   **B.A. 2012**

PEER REVIEWED PUBLICATIONS (11)

M. Yaghoobi, T. Berman, Z. Chen, **A. E. Tallman**, et al. "Recent Advances in PRISMS-Plasticity Software for Simulation of Deformation in Mg Alloys." *Magnesium Technology **2024***.

A. E. Tallman and M. Yaghoobi, "PRISMS Indentation: Open-Source simulations of indentation testing using crystal plasticity." *Integrating Materials and Manufacturing Innovation, **2024***.

A. E. Tallman, D. John, T. Paul, A. Agarwal, "Uncertainty Quantification of a High-Throughput Profilometry-Based Indentation Plasticity Test of Al 7075 T6 Alloy." *Frontiers in Materials*, **2022**.

A. E. Tallman, R. Pokharel, D. Bamney, D. E. Spearot, R. A. Lebensohn, D. Brown, L. Capolungo, "Data-Driven Analysis of Neutron Diffraction Line Profiles: Application to Plastically Deformed Ta," *Scientific Reports,* **2022**.

A. E. Tallman, M. Arul Kumar, C. Matthews, and L. Capolungo, "Surrogate Modeling of Mechanistic Viscoplasticity: Application to Transient Conditions in HT-9 Cladding," *The Journal of The Minerals, Metals & Materials Society*, 2020. https://doi.org/10.1007/s11837-020-04402-2.

A. E. Tallman, M. Arul Kumar, A. Castillo, W. Wen, L. Capolungo, and Carlos. N. Tomé, "Data-driven constitutive model for the inelastic response of metals: application to 316H steel," *Integrating Materials and Manufacturing Innovation*, 2020. https://doi.org/10.1007/s40192-020-00181-5.

A. E. Tallman, L. P. Swiler, Y. Wang, and D. L. McDowell, "Uncertainty propagation in reduced order models based on crystal plasticity," *Computer Methods in Applied Mechanics and Engineering*, vol. 365, p. 113009, Jun. 2020. https://doi.org/10.1016/j.cma.2020.113009.

D. Bamney, **A. E. Tallman**, L. Capolungo, D. E. Spearot, "Virtual diffraction analysis of dislocations and dislocation networks in discrete dislocation dynamics simulations." *Computational Materials Science*, vol. 174, 2020. https://doi.org/10.1016/j.commatsci.2019.109473.

A. E. Tallman, K. S. Stopka, L. P. Swiler, Y. Wang, S. R. Kalidindi, and D. L. McDowell, "Gaussian-Process-Driven Adaptive Sampling for Reduced-Order Modeling of Texture Effects in Polycrystalline Alpha-Ti." *The Journal of The Minerals, Metals & Materials Society*, vol. 71, no. 8, 2019. https://doi.org/10.1007/s11837-019-03553-1.

A. E. Tallman, L. P. Swiler, Y. Wang, and D. L. McDowell, "Hierarchical top-down bottom-up calibration with consideration for uncertainty and inter-scale discrepancy of Peierls stress of bcc Fe." *Modelling and Simulation in Materials Science and Engineering*, vol. 27, no. 6, 2019. https://doi.org/10.1088/1361-651X/ab23e4.

A. E. Tallman, L. P. Swiler, Y. Wang, and D. L. McDowell, "Reconciled Top-down and Bottom-up Hierarchical Multiscale Calibration of bcc Fe Crystal Plasticity." *International Journal of Multiscale Computational Engineering*, vol. 15, no. 6, 2017. https://doi.org/10.1615/IntJMultCompEng.2017021859.

EDITED BOOK CHAPTERS (1)

A. E. Tallman, L. P. Swiler, Y. Wang, and D. L. McDowell, "14 - Hierarchical multiscale model calibration and validation for materials applications," in *Uncertainty Quantification in Multiscale Materials Modeling*, Y. Wang and D. L. McDowell, Eds. Woodhead Publishing, 2020, pp. 449–471.

PAPERS IN PROGRESS (5) Advisees at FIU underlined

A. E. Tallman, M. Yawney, and A. Coso Strong, "'It's about communication, but it is not about communication': A Collaborative Exploration of Oral Communication Events as Learning" planned submission in *Teaching in Higher Education.*

E. Michalakis, M. W. Priddy, **A. E. Tallman**, "Effective Hardening models in Profilometry-based Indentation Plastometry with Model Form Uncertainty Quantification" planned submission in *Computational Methods in Applied Mechanical Engineering.*

C. Puentes, A. M. Rodriguez Negron, D. Kundal, **A. E. Tallman**, "Optical Profilometry-based analysis of anisotropy in indentation testing of cold spray Al 7075" planned submission in *Advances in Manufacturing.*

A. M. Rodriguez Negron, **A. E. Tallman**, "An open-source toolkit for nucleation-controlled property optimization in beta-stabilized Ti alloys" planned submission in *Integrating Materials and Manufacturing Innovation.*

A. K. Blanchard, **A. E. Tallman**, A. Hamrani, "Enhancing Supersonic Efficiency: Comprehensive Aerodynamic Optimization of NASA's X59 Aircraft with FFD and Navier-Stokes Techniques." planned submission in *Journal of Optimization Theory and Applications.*

INVITED PRESENTATIONS (4)

A. E. Tallman and M. Yaghoobi, "PRISMS Indentation: Multi-scale elasto-plastic virtual indentation module." presented at the annual PRISMS workshop 2023, Ann Arbor, MI, 10-Aug-2023.

A. E. Tallman, D. John, T. Paul, A. Agarwal, "Uncertainty Quantification of a high-throughput local plasticity test: profilometry-based indentation plastometry of Al 7075 T6 Alloy." presented at the Materials Science and Technology technical meeting, Pittsburgh, PA, 10-Oct-2022.

A. E. Tallman and L. Capolungo, "Developing Surrogate Models for Crystal Plasticity-based Creep by Leveraging Macroscale Constitutive Relations," presented at the Materials Science and Technology technical meeting, Columbus, OH, 14-Oct-2021.

A. E. Tallman, R. Pokharel, D. Brown, and L. Capolungo, "Synthetic Data-Driven Predictions of Dislocation Density from Polycrystalline Ta Neutron Diffraction Line Profiles," presented at the International Materials Applications and Technologies ASM Annual Meeting 2021, St. Louis, MO.

DESIGNED AND FACILITATED WORKSHOPS & SHORT COURSES

Title	Venue	Date
Computational Uncertainty Quantification (Short Course)	The Materials Society (TMS): Accelerating VVUQ	Aug. 19th, 2024
Reach Through: Immersive Technical Communication for graduate engineering students	FIU Theater Department	Sept. 30th, 2022, May 5th, 2023, May 3rd, 2024
Reach Through: Immersive Technical Communication (Abridged)	CELL-MET Retreat FIU	Feb. 16th, 2023

RESEARCH FUNDING AND GRANT APPLICATIONS

Funding awarded as PI at FIU: $215,957.50

Completed

Investigators:	**PI Aaron Tallman**
Grant Title:	ICME-based Modeling of Metallic Materials
Agency:	Honeywell Federal Manufacturing & Technologies
Dates:	4/18/2023-8/31/2023
Funding:	$87,997.50

Investigators:	**PI Aaron Tallman**
Grant Title:	ICME-based Modeling of Metallic Materials - Gap
Agency:	Honeywell Federal Manufacturing & Technologies
Dates:	9/01/2023-11/30/2023
Funding:	$22,000.00

Awarded

Investigators:	**PI Aaron Tallman**
Grant Title:	ICME-based Modeling of Metallic Materials
Agency:	Honeywell Federal Manufacturing & Technologies
Dates:	3/01/2024-8/31/2024
Funding:	$105,960.00

Applied-Under Review

Investigators:	**FIU PI Aaron Tallman**
Collaborators:	UF PI Yong Yang
Grant Title:	ICME-based Modeling of Metallic Materials
Agency:	Nuclear Regulatory Commission
Dates:	10/01/2024-9/30/2027
Funding:	$237,500 (FIU portion of $500,000)

Investigators:	**PI Aaron Tallman** Key Personnel: Michael Yawney
Grant Title:	CAREER: Precise local mesoscale property determination through integrating uncertainty quantification of experiments and simulations of spherical micro-indentation plastometry
Agency:	National Science Foundation -Mechanics of Materials and Structures
Dates:	7/01/2025-6/31/2030
Funding:	$550,449
Investigators:	**PI Aaron Tallman** Key Personnel: Michael Yawney

<u>Applied – Not Funded</u>

Investigators:	**PI Aaron Tallman** Key Personnel: Alexandra Coso Strong and Michael Yawney
Grant Title:	CAREER: Informative Bayesian stochastic plasticity fingerprinting of process-intensive metal components
Agency:	National Science Foundation -Mechanics of Materials and Structures
Dates:	7/01/2024-6/31/2029
Funding:	$590,449

Investigators:	**PI Aaron Tallman**
Grant Title:	3D Printed BN Nanoreinforced Bimetallic Composites to Target Dimensional Stability
Agency:	National Aeronautics and Space Administration -Early Career Faculty
Dates:	10/01/2022-9/30/2025
Funding:	$599,976.00

<u>In Preparation</u>

Investigators:	**PI Aaron Tallman**
Collaborators:	Matthew W. Priddy, Carolyn Seepersad
Grant Title:	Uncertainty Quantification of microstructure sensitive design for Fatigue in Additively manufactured Ti6Al4V Lattice Structures
Agency:	National Nuclear Security Administration PSAAP-IV
Dates:	9/01/2025-8/30/2030
Funding:	$3,500,000.00 (My funding $1,250,000.00 -- 33%,)

SERVICE ACTIVITIES

National Service
- TMS Planning Committee Member: Integrated Computational Materials Engineering
- TMS Planning Committee Member: Mechanical Behavior of Materials
- Member of International Association for Computational Mechanics
- NSF Review panelist, NSF Ad Hoc Reviewer
- Review Editor of Frontiers in Materials – Computational Materials Science
- Referee for 7 Journals: IJP, Computational Materials Science, JOM, IMMI, Materials Letters, Steel Research Intl., Adv. in Eng. Soft.
- Referee for 1 Book Chapter: Uncertainty Quantification in Multiscale Materials Modeling
- Referee for 1 Conference paper: SIAM UQ

Departmental Service
- Judge: Poster Session AMERI 2022 MESH Conference March 18th
- MME Curriculum Committee 2021-2023
- MME Strategic Planning Committee 2022-2023
- Search Committee Member – Open Rank, Tenure Track Professor, Computational Thermo Fluid Mechanics (Job ID: 528031) 2022-2023
- Search Committee Member: Open Rank Computational Thermal Fluids 2022-2023

College/University Service
- ECE Information Technology Committee 2022-2023
- Honors College New course proposal 2023

TEACHING

Course	Term	Level	SPOTS Responses/Enrollment	Avg. SPOTS* Overall Rating
EMA5104 Adv. Mech. Prop. of Materials	Fall 2021	G	6/8	4.70
EML4551 Ethics and Design Project Org.	Spr. 2022	UG	44/79	4.81
EMA5104 Adv. Mech. Prop. of Materials	Fall 2022	G	2/5	4.80
EML2032 Intro. To Programming for ME	Spr. 2023	UG	20/48	3.77
EML2032 Intro. To Programming for ME	Fall 2023	UG	40/48	4.23

Averages per category are based on a 5-point scale. Excellent = 5; Very Good = 4; Good = 3; Fair = 2; Poor = 1

TEACHING INNOVATIONS

Course	Term	Innovation
EMA5104 Adv. Mech. Prop. of Materials	Fall 2021	Project based learning: Report, peer-review, and final presentation on student choice of material failure
EML4551 Ethics and Design Project Org.	Spr. 2022	Technology: Developed a custom algorithm for the optimal matching of students into teams
EML2032 Intro. To Programming for ME	Spr. 2023	Technology: Use of online platforms for programming assignments and lectures (Google Colab)
EML2032 Intro. To Programming for ME	Spr. 2023	Project-based learning: Designed sequence of graded assignments for students to learn through doing
EML2032 Intro. To Programming for ME	Fall 2023	Technology: Heuristic Grading of assignments using a custom developed algorithm (to relieve TA shortages)
EML2032 Intro. To Programming for ME	Spr. 2024	Learner-focused teaching: Lectures adapted to make pair-work using interactive notebooks during class time, each pair moving at own pace

MENTORING

PhD Student Advising (* Denotes Externally Funded)

Student Name	Program	Role	Year [Projected Graduation]
Astrid Michelle Rodriguez Negron*	PhD Materials Science Engineering	Advisor	2022 – [2027]
Fatama Huda*	PhD Mechanical Engineering	Advisor (Co-advised by D. Dickerson)	2023 – [2027]
Dharmanshu Kundal	PhD Mechanical Engineering	Advisor	2023 – [2027]
Emmanuel Michalakis	PhD Mechanical Engineering Mississippi State University	Co-Major Professor (Advisor M.W. Priddy)	2022 – [2028]
Ann Kanaya Blanchard	PhD Mechanical Engineering	Co-Major Professor (Advisor A. Hamrani)	2023 – [2024]
Maria Karla Sotolongo	PhD Mechanical Engineering	Committee Member (Advisor B. Boesl)	2023 – [2025]
Somnath Somadder	PhD Mechanical Engineering	Committee Member (Advisor A. Agarwal)	2023 – [2027]

Undergraduate Research Advising

Christian Puentes	2023-2024
Jose Diaz-Lanza	2024-
Audrey Torres	2024-

Senior Design Project Advisor

Students	Project	Years
Nateish Taylor, Alex Aviles, Bryan Baquero, Diego Concepcion	Solar Harvesting	2021-2022
Lucas Kapusta, D'angelo Serra, Eduardo Hidalgo, Lucas Woginger	Electric Charging Station	2022
Camilo Martinez Vazquez, Abdiel Hernandez, Tenbite Tesfaye, Kiana Murat	Wave Energy on a Budget	2023