



## RESEARCH INTERESTS

*Audio-informed Geometry || Geometry-informed Audio*  
*Aligning Sound and 3D Motion for Controllable, Physics-Grounded Synthesis*

- Controllable & interpretable generative models
- Speech-driven 3D facial animation
- Physics-based sound & acoustic simulation
- Implicit neural representations (INRs) & geometry processing

## EDUCATION

**New Jersey Institute of Technology, Newark NJ**

2023 - Present

*Ph.D., Computer Science (expected 2027)*

- Research Direction – Neural Audio-Geometry Alignment for Controllable, Physics-Grounded Synthesis
  - Advisor: Dr. Przemyslaw Musialski

**New Jersey Institute of Technology, Newark NJ**

2022

*M.S., Data Science - Computational Track*

- Thesis: A Neural Analysis-Synthesis Approach to Learning Procedural Audio Models
  - Advisor: Dr. Mark Cartwright

**New Jersey Institute of Technology, Newark NJ - summa cum laude**

2021

*B.S., Computer Science*

- Minor in Applied Mathematics

## PROFESSIONAL EXPERIENCE

**New Jersey Institute of Technology, Newark NJ**

*Teaching Assistant*

Jan 2023 - Present

- CS 101: Computer Programming & Problem Solving
- CS 280: Programming Language Concepts
- DS 675: Machine Learning

*Research Assistant*

Jan 2021 - May 2023

- Deep generative approaches to synthesize realistic and high fidelity environmental sound classes
  - Under Dr. Mark Cartwright - Sound Interaction and Computing Lab (SInC)
- Deep learning approaches to learn parametric solutions to Euler-Bernoulli Elastica curvature.
  - Under Dr. Przemysław Musialski
- Speeding up Physics-Based Sound Rendering / Acoustic Simulation with data-driven methods

*Teaching Assistant*

Jan 2021 - May 2021

- CS 288: Intensive Programming in Linux — 3 Credits, 40 students

**ZOLL Medical**, Parsippany NJ

Software Engineering Intern

Jan 2021 – Aug 2021

- Automation scripts for Jenkins and Azure DevOps build pipelines
- Test-driven development for calibration software of ventilators and aspirators (Python and C#)

## PROJECTS

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### **Sensorium AI – Accessible, Expressive Speech Synthesis**

- In collaboration with the Sensorium Ex opera
  - <https://www.npr.org/2025/05/24/nx-sl-5405023/opera-nonverbal-ai-sensorium-ex>
- Trained a real-time TTS/voice-modulation model from disentangled speech factors (phoneme + prosody) for performance and assistive use.
- Built Max/MSP modules to create/manipulate/use those features as inputs to the synthesizer for live performance.
  - <https://sensorium-ai-speech.github.io/>

### **Interactive web app for generating expressive and realistic footstep sound effects**

- Created a web app which allows a user to specify control variables comprising a drawn 1D force curve, surface material label, and locomotion speed. These variables are then used as input to a data-driven and controllable procedural audio model of footstep sound effects.
  - <https://dependanz.github.io/projects/prove.html>

### **VR Software Programming (Undergraduate Industry Capstone Project)**

- Worked with a team to fine-tune and develop an experimental platform for a project that allows users to view and edit hierarchical ontologies in a virtual reality environment
  - First place prize in capstone presentations
- Advisor: Dr. Margarita Vinnikov, NJIT iXR lab

### **“expression” – A social media web app with a personalized song recommendation system**

- Worked with a team to create a social media web application where each post displays music from Spotify’s API by using NLP to recommend a song by the post’s hashtags

## PUBLICATIONS

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1. Serrano, Danzel, and Przemyslaw Musialski. ‘Disentangled Phoneme-Prosody Mapping for Controllable 3D Facial Animation’. Proceedings of the Special Interest Group on Computer Graphics and Interactive Techniques Conference Posters, 2025, pp. 1–2.
2. Serrano, Danzel, et al. ‘HOSC: A Periodic Activation Function for Preserving Sharp Features in Implicit Neural Representations’. arXiv Preprint arXiv:2401. 10967, 2024.
3. Serrano, Danzel, and Mark Cartwright. ‘A General Framework for Learning Procedural Audio Models of Environmental Sounds’. arXiv Preprint arXiv:2303. 02396, 2023.
4. Serrano, Danzel, “A neural analysis-synthesis approach to learning procedural audio models” (2022). Theses. 2097. <https://digitalcommons.njit.edu/theses/2097>

## TECHNICAL SKILLS

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- **Programming Languages:** C/C++, CUDA, Python, R, Java, MATLAB, C#, Scala
- **AI / DSP:** PyTorch, Tensorflow, scipy, librosa, matplotlib, pandas, Max/MSP, PureData
- **Web Development:** PHP, Javascript, Flask
- **Software Engineering:** Unit Testing (C#, Python), Linux Development
- **Misc:** AWS (S3, EC2, API), Amazon Mechanical Turk, Unity3D, OpenGL, VR/XR, Adobe (Audition, Photoshop, Premiere Pro, After Effects), Spark, MAPP 3D

## RELEVANT COURSEWORK

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- **Machine Learning/Deep Learning**
- **Stochastic Processes**
- **Artificial Intelligence**
- **Image Processing**
- **Analytical/Computational Neuroscience**
- **Boundary Integral Equations**
- **Specialization IBM AI Engineering** on Coursera. Certificate earned 01/20/20
- **Deep Learning by DeepLearning.AI** on Coursera. Certificate earned 12/24/20
- **Fundamentals of Accelerated Computing with CUDA C/C++** NVIDIA online course
- **Intro to Cloud Computing** on Coursera. Certificate earned on November 4, 2022

## RESEARCH FOUNDATIONS

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- Audio Signal Processing, Procedural Audio Synthesis, Acoustic Simulation
- Statistical Learning Theory, PAC-Bayesian Learning
- Differential Geometry, Calculus of Variations
- Information Geometry, Probability Theory, Optimal Transport
- Neuroscience of Audition, Computational Neuroscience

## PROFESSIONAL MEMBERSHIPS

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- IEEE [Institute of Electrical and Electronics Engineers]
- IEEE (SPS) [Signal Processing Society]
- ACM [Association for Computing Machinery]
  - SIGGRAPH   ◯ SIGEVO   ◯ SIGAI   ◯ SIGCHI
- ASA [Acoustical Society of America]

## LEADERSHIP/ACTIVITY

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- Leader of Technology Ministry and Livestreaming Team at Word Christian Fellowship International (WCFI) [Facebook Live, Youtube, Twitch.tv, IG Live]
- Sound Interaction and Computation Lab (SInC) - <http://sinc-lab.com/>
- Attended the following conferences: NVIDIA GTC 2021, ISMIR 2021, NEMISIG 2022, SIGGRAPH 2025