

## Micah Taylor

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### Areas of interest:

Interactive Sound Propagation : Visibility & Rendering : Parallel & High Performance Computing

### Education:

- PhD, MS - Computer Science, University of North Carolina, Chapel Hill  
“Interactive Sound Propagation for Massive Multi-user and Dynamic Virtual Environments”
- BS - Computer Science, Rose-Hulman Institute of Technology

### Skills:

- Programming: C, C++, HLSL, Javascript, PHP, Bash, MIPS32, Verilog
- APIs & Tools: Vulkan, DX12, OpenMP, Perforce, SFML, Linux, Apache, Git, GDB, Visual Studio
- Soft skills: Conflict resolver, Accessibility focused, Structured planner

### Work experience:

- [Volition](#) - Champaign, IL, 2019-2023  
*Principal Programmer - Rendering*
  - Created high contrast rendering mode with configurable colors and highlights
  - Invented Adaptive Quality Management for maintaining high framerates
  - Developed efficient algorithms for Gen8 consoles, including undergrowth deformation and particle/fog visibility control volumes
  - Designed multi-track weather control system with effect spawning and local volumes
  - Responsible for particle system features, including robust randomization, seamless ribbon interpolation, turbulence and wind effects, and emission frame smoothing
- [Rose-Hulman Institute of Technology](#) - Terre Haute, IN, 2012-2019  
*Associate Professor with Tenure*
  - Invented and developed [auditory display headset](#)
  - Created interactive web based acoustic simulator with cross compiled C++ backend
  - Designed cross platform graphics courses, covering rasterization, real-time raytracing, GPGPU, and image processing
- [Impulsonic \(now Valve\)](#) - Carrboro, NC, 2016 Summer  
*Senior Researcher*
  - Developed proprietary acoustic algorithms for game middleware
  - Developed software with team in-office and remotely
- [Dolby](#) - San Francisco, CA, 2010 Summer  
*Research Intern*
  - Designed fast GPU and CPU based audio rendering system
  - Collaborated with senior researchers on large scale acoustic rendering systems

- University of North Carolina, [Gamma group](#) - Chapel Hill, NC, 2007-2012  
*Research Assistant*
  - Created interactive [GPU based sound propagation system](#) for early specular reflection and diffraction
  - Designed interactive [acoustic simulation](#) with diffuse, specular, and diffraction components
  - Developed [diffraction tracing](#) using real-time ray frustum tracer
  - Author or co-author on 8 acoustic papers, resulting in 3 patents
- [Baker Hill](#) - Carmel, IN, 2004-2007  
*Software Engineer*
  - Served as lead designer on critical path projects for major loan origination products
  - Developed tools to automate refactoring of over 50,000 lines of code
  - Designed and implemented automatic build and deploy process across multiple platforms and devices

## Patents

1. [US 8995675](#) Methods and systems for direct-to-indirect acoustic radiance transfer, Anish Chandak, Lakulish Antani, Micah Taylor, Dinesh Manocha
2. [US 8958567](#) Method and system for split client-server reverberation processing, Nicolas Tsingos, Micah Taylor
3. [US 8847695](#) Methods, systems, and computer readable media for fast geometric sound propagation using visibility computations, Anish Chandak, Lakulish Antani, Micah Taylor, Dinesh Manocha

## Projects:

- Invented and supervised creation of an [Auditory Display Headset](#) capable of creating audio landscapes from real world objects.
- Created [libchb](#), a library to display images with Unicode characters and ANSI color codes in text mode terminals.
- Designed and developed [CourseUp](#), a domain specific language for defining courses in a flexible and intuitive format.
- Implemented platform independent [realtime ray tracer](#). Supports multiple hierarchy structures, split-selectors, shaders, and post-processing.
- Designed and implemented [fast motion](#) blur effects using sample reprojection. Generates similar results to stochastic motion blur at a fraction of the cost.
- Maintain and host my [personal webpage](#). Custom markdown extensions with dynamic backend.

## Publications:

### Journals and conferences

1. Micah Taylor. [CourseUp: Human readable course language](#), Journal of Computing Sciences in Colleges 2018
2. Micah Taylor, Sid Stamm, and Christine Taylor. [The impact of changing homework frequency in a computer architecture course](#), Journal of Computing Sciences in Colleges 2018
3. Micah Taylor and Francis Meng. [Web-based geometric acoustic simulator](#), 23rd International ACM Conference on 3D Web Technology 2018  
[10.1145/3208806.3208817](#)
4. Micah Taylor, Anish Chandak, Qi Mo, Christian Lauterbach, Carl Schissler, and Dinesh Manocha. [Guided Multiview Ray Tracing for Fast Auralization](#), IEEE Transactions on Visualization and Computer Graphics 2012 (26%)  
[10.1109/TVCG.2012.27](#)

5. Lakulish Antani, Anish Chandak, Micah Taylor, Dinesh Manocha. [Direct-to-Indirect Acoustic Radiance Transfer](#), IEEE Transactions on Visualization and Computer Graphics 2012 (26%)  
10.1109/TVCG.2011.76
6. Lakulish Antani, Anish Chandak, Micah Taylor, Dinesh Manocha. [Efficient finite-edge diffraction using conservative from-region visibility](#), Applied Acoustics 2011 (43%)  
10.1016/j.apacoust.2011.09.004
7. Anish Chandak, Lakulish Antani, Micah Taylor, Dinesh Manocha. [Fast and Accurate Geometric Sound Propagation using Visibility Computations](#), International Symposium on Room Acoustics 2010 10.1260/1351-010X.18.1-2.123
8. Micah Taylor, Anish Chandak, Lakulish Antani, Dinesh Manocha. [RESound: Interactive Sound Rendering for Dynamic Virtual Environments](#), 17th International ACM Conference on Multimedia 2009 (16%)  
10.1145/1631272.1631311
9. Anish Chandak, Lakulish Antani, Micah Taylor, Dinesh Manocha. [FastV: From-point Visibility Culling on Complex Models](#), 20th Eurographics Symposium on Rendering 2009 (29%)  
10.1111/j.1467-8659.2009.01501.x
10. Micah Taylor, Anish Chandak, Zhimin Ren, Christian Lauterbach, Dinesh Manocha. [Fast Edge-Diffraction for Sound Propagation in Complex Virtual Environments](#), EAA Symposium on Auralization 2009
11. Anish Chandak, Christian Lauterbach, Micah Taylor, Zhimin Ren, Dinesh Manocha. [AD-Frustum: Adaptive Frustum Tracing for Interactive Sound Propagation](#), IEEE Transactions on Visualization and Computer Graphics 2008 (26%)  
10.1109/TVCG.2008.111

#### Technical reports

1. Micah Taylor, Nicolas Tsingos, Dinesh Manocha. [Rendering environmental voice reverberation for large-scale distributed virtual worlds](#), 2014
2. Lakulish Antani, Anish Chandak, Micah Taylor, Dinesh Manocha. [Direct-to-Indirect Acoustic Radiance Transfer](#), 2010
3. Lakulish Antani, Anish Chandak, Micah Taylor, Dinesh Manocha. [Fast Geometric Sound Propagation with Finite Edge Diffraction](#), 2010

#### Other

- Micah Taylor, Anish Chandak, Lakulish Antani, Dinesh Manocha, [Interactive geometric sound propagation](#), EE Times, 2010
- Micah Taylor, Anish Chandak, Lakulish Antani, Dinesh Manocha, [Interactive Geometric Sound Propagation and Rendering](#), Intel Academic Spotlight, 2010
- Micah Taylor, Anish Chandak, Zhimin Ren, Christian Lauterbach, Dinesh Manocha. [Fast edge diffraction for sound propagation in complex virtual environments](#), [Acoustical Society of America's North Carolina Chapter](#) (Best presentation award), 2009