



IUPUI

SCHOOL OF INFORMATICS AND COMPUTING

DEPARTMENT OF HUMAN-CENTERED COMPUTING

Indiana University-Purdue University
Indianapolis

Grant Information:

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Biography:

Zeb Wood's comfort zone is at the edge of emerging media, focusing in 3-D design integrated formats. He's worked with students on projects that improve lives and disrupt industries and instructs in all areas of 3-D production, including 3D printing, augmented and virtual reality.

Lecturer and co-director of the Media Arts and Sciences Program (MAS) within the Human Centered Computing Department (HCC), of the School of Informatics and Computing (SoIC) at Indiana University Purdue University (IUPUI). Amongst my many efforts are several research partnerships and collaborations utilizing me and my student's skill sets in 3D animation to innovate and provide expertise in Virtual Reality, Augmented Reality and 3D print for personalized medicine, dentistry and psychiatry interventions here at IUPUI. We have created several disruptive digital pipelines in the creation of maxillofacial prosthetics, patient specific radiation bolus design, and several virtual reality simulations for surgeons, psychiatrists, dentists and medical education/simulation, listed below.

Leads in the following roles: project manager, designer, interaction engineer, 3D environment modeler, character artist on several virtual reality, augmented reality, 3D print, funded collaborations. Wherever possible, integrates co-curricular work on these projects with undergrad students to give them studio and research-oriented experiences. In those situations, Zeb fulfills the role of project manager, director, mentor, and lead 3D artist. Educating my students in this curricular and co-curricular studio context is a core pillar of my scholarship of teaching.

Personal production expertise in 3D content creation in the form of digital environments, digital avatars, their animation and believability. Very experienced in user interaction and virtual and augmented reality user interface design and research.

Wood has worked with hundreds of students, faculty, and professionals internationally on a diverse set of projects, here are a handful:

- NIH \$1.2million federally funded project discovering VR's utility and impact on youth with Aggression Disorders.
- Funded Education Dentistry Application for Radiograph Training
- Executive Producer of ACM SIGGRAPH's Scavenge AR Conference Application, 2017-2019

- Author, CLIR Report – 3D/VR in Academic Library: Emerging Practices and Trends
- Designed Nature Inspired Football Helmet, "Cellular Helmet Liner Design through Bio-inspired Structures and Topology Optimization of Compliant Mechanism Lattices," Published SAE
- Virtual Bethel, a unique collaboration involving digital archiving and a 3-D re-creation of the Bethel AME Church, Indianapolis' oldest African American Congregation.
- His work with student researcher Cade Jacobs, in collaboration with the IU School of Dentistry at IUPUI, has led to new techniques in the field of maxillo-facial prosthetic creation, resulting in patent.
- Innovation to Enterprise Commercialization program collaboration, Digital/Interactive Mathematics application
- Car Design Studio Application, Indianapolis, Museum of Art 'Dream Cars' Exhibit'

While a student, Wood founded the nonprofit IndianaUploaded, an online design competition community for Indiana high school and college students. He continues to discover worthwhile opportunities and careers, and to connect local artists, designers, and animators to innovative opportunities.

Research Interests:

- 3-D printing
- Augmented and virtual realities
- Character and creature development
- Community building
- Digital and traditional arts
- Servant leadership
- Political media
- Social media
- Social, augmented, mobile, and alternative gaming applications.
- Storytelling
- Visualization

PROFESSIONAL HONORS AND AWARDS:

Teaching	Granted By	Date Awarded
Nominee, MIRA Educator of the Year	Techpoint	2021
Scholarship of Teaching	IUPUI	2018
Excellence in Teaching	IUPUI	2016
Faculty of the Year	Art Institute	2011
Research		
Top 3D Medical Visualization	ATS	2018
2 nd Place Research Poster	AAMP	2016
Service		
Excellence in Engagement and Service	IUPUI	2017
IUPUI Top Student Organization Advisor	IUPUI	2008, 2009

Professional

Education:

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|-----------|--------------------------|------------------------|
| • 05/2003 | A.S. Liberal Arts | Ancilla Domini College |
| • 05/2005 | A.S. Graphics Technology | Purdue University |
| • 05/2007 | B.S. Spatial Graphics | Purdue University |
| • 05/2009 | M.S. Technology | Purdue University |

Appointments & Positions:

- 2017 - Present - Co-Director, Media Arts and Science Program
- 2012 - Present – Full Lecturer, School of Informatics, IUPUI, Indianapolis, Indiana
- 2010 - 2012 – Lecturer, Art Institute Indianapolis, Indianapolis, Indiana

Primary Classes:

N345 – Organic Modeling and Texturing
N346 – 3D Motion Capture & Animation
N420 – Multimedia Production Development
N440 – 3D Compositing and Visual Effects
N441 – 3D Production Team (co-teach w/ Albert William)
N442 – Advanced 3D Character Animation
N445 – 3D Character Development
N447 – 3D Prototyping for Visualization & Abstraction
N449 – 3D Prototyping for Medical & Dental Applications

Student Group Advisor

[ACM SIGGRAPH IUPUI Student Chapter](#)
[Gamers Hall – Esports @ IUPUI](#)

Presentations, & Grants:

Contributions to Science

1. Virtual reality for the assessment of childhood aggression and mental health interventions prototyping grant and subsequent data from patients has inspired several mental health faculty and researchers to request early collaborations with my colleagues and students on IUPUI's campus. Our initial reporting of physio data linked to aggressive male children has illustrated much potential in physio linking outcomes to machine interface prototypes in our schools' research and it being a key component of much of our data collection, validation and future collaborations.

- Hummer, T. (Presenter), Wood, Z. M. (Co-Presenter), Miller, K. (Co-Presenter), Thorington Springer, J. (Co-Presenter), Neumann, D. M. (Co-Presenter), Research/Creative Activity, Poster, Competitive/Refereed, "Feasibility of Virtual Reality to Improve Social Perspective Taking in Youth With Disruptive Behavior Disorders", Conference, 75th Annual Convention of the Society of Biological Psychiatry., Society of Biological Psychiatry, Hilton Midtown, New York, NY, United States, Academic, International. (April 30, 2020)

2. **Digital Design for Maxillofacial Prosthetics, radiation bolus, pre-surgical guides** and other customized patient devices has been a key collaboration for my 3D oriented students to pivot their entertainment focus towards STEM and medicine. Since our initial poster in 2015, we have served nearly 40 patients in partnership with the IU School of Dentistry and IU School of Medicine primarily in the Maxillofacial Prosthetics and Surgery departments. We have become leading experts in digital imaging, design, and 3D printing of devices customized perfectly for every patients unique needs.

Completed national/international presentations:

- Bellicchi, T., Jacobs, C.B.T., **Wood, Z.** Ghoneima, A., Diaz-Rubayo, D., Alderson, N., Levon, J., Morton, D (2016, October). Facial Scanning, Digital Sculpting, and Stereolithographic Rapid Prototyping: Auricular, Orbital, and Nasal Prosthetic Case Reports. POSTER at the 2016 American Academy of Maxillofacial Prosthodontics, San Diego California.
- Bellicchi, T., Jacobs, C.B.T., **Wood, Z.** Ghoneima, A., Levon, J., Morton, D. (2016, October). 3D Printing Cast and Interim Obturator for Maxillectomy with Pedicled Buccal Fat Pad Flap. POSTER at the 2016 American Academy of Maxillofacial Prosthodontics, San Diego California.
- Bellicchi, T., Jacobs, C.B.T., **Wood, Z.**, Al-Qahtani, N., Alderson, N., Rogers, J., Haug, S., Levon, J. (2015, October). Mandibulectomy Prosthetic Case Report: Comparison of Traditional and Digital Fabrication Methods with 3DMD Face Scanning, Digital Sculpting, and 3-Dimensional Printing. POSTER at the 2015 American Academy of Maxillofacial Prosthodontics, Orlando, Florida.

3. **3D printing and augmented reality to educate residents in family medicine and surgery** was designed to enhance the **learning for both third year medical students and graduate Media Arts and Science (MAS) students using Augmented Reality and 3D print**. Medical students had the opportunity to learn musculoskeletal exams with the aid of an interactive joint model, as well as with an online, asynchronous 3D augmented reality model. This project will improve the musculoskeletal curriculum with novel technologies aimed at improving the learning experience and facilitating long-term knowledge and acquisition of these critical techniques. MAS' students worked on a more complex 3D and interactive projects that link the physical and augmented worlds while combining efforts with a discipline unlike their own.

Completed national/international presentations:

- Cooper, S. L., **Wood, Z.**, Henry, A., Renshaw, S., Vaden, V., & Brown, L. (2017, May). Applications of augmented reality in a clerkship experience. Discussion/Lecture presented at the 2017 Information Technology in Academic Medicine Conference, Association of American Medical Colleges, Atlanta, GA.
- Cooper, S. L., **Wood, Z.**, Mayall, H., Renshaw, S. E., Vaden, V., Burba, J. L., & Henry, A. (2017, February). Augmented reality with 3D print technology in a musculoskeletal workshop. Works in Progress presented at the 2017 Society of Teachers of Family Medicine Conference on Medical Student Education, Anaheim, CA.
- Cooper, S. L., **Wood, Z.**, Mayall, H. J., Renshaw, S. E., & Vaden, V. (2016, November). Using augmented reality with 3d print technology in a medical school environment. Roundtable Discussion presented at the E-Learn 2016: World Conference on E-Learning, Washington, DC.
- Cooper, S. L., **Wood, Z.**, Mayall, H. J., Renshaw, S. E., & Vaden, V. (submitted). Lessons learned with the development of creating augmented reality with 3d print technology for enhanced

learning in a medical school environment. Best Practices submitted to the E-Learn 2017: World Conference on E-Learning, Vancouver, BC (2017, November)

4. **Virtual Reality for historical preservation** has been a key passion for many local librarians and museum preservationists. We have developed a methodology for preservation both singular artifacts and entire digital spaces. Early successes with 'Bethel VR' have inspired much work in new proposals on campus yet to be published. The same work done in preservation of spaces into the virtual environment is implemented in all virtual environment creation.

- **Wood, Z.M. (Author)**, William, A., Copeland, A. Virtual Reality for Preservation: Production of Virtual Reality Heritage Spaces in the Classroom. CLIR REPORT 2019
- Copeland, Andrea, (Co-Author), Murillo, Angela P., (Author), Spotts, Lydia, (Co-Author), Yoon, Ayoung, (Co- Author), **Wood, Zebulun M., (Co-Author)**, "Complexities of Digital Preservation in a Virtual Reality Environment, the Case of Virtual Bethel", International Data Curation Conference Proceedings. Accepted December 2018.
- Copeland, Andrea, (Author), **Wood, Zebulun M., (Co-Author)**, Spotts, Lydia, (Co-Author), Yoon, Ayoung, (Co- Author), "Learning through virtual reality: Virtual Bethel case study." Accepted. Proceedings of the iConference 2018. Accepted November 2017.

Books/Chapters

- Wood, Z.M., William, A., Yoon, A., & Copeland, A. Virtual Bethel: Preservation of Indianapolis's Oldest Black Church. Research Methods for the Digital Humanities. Palgrave Macmillan 2018.

Grants

Title	Granting Agency	Role	Amount	Dates
VR Social Perspective Taking	NIH R61/R33	Co-Pi	4,062,630	5/19-
VR Endoscopy	IU – Commercialization Grant	Co-PI	\$25,000	8/2021 -
VR Radiology	IU – Curriculum Enhancement Grant	PI	\$15,000	5/2020 -
Design Sports Helmet	IU – Sports Innovation Institute	CO-Pi	\$20,000	12/2016
Forging Identity	IU- Welcoming Grant	Senior Personnel	2% Effort	05/2019
Virtual Bethel	IU- New Frontiers Grant	Co-PI	\$59,043	05/2018
Digital Polish Castle	IU-UROP	PI	\$500	08/2018
IUPUI VR	IU Welcoming Grant	Consultant	\$50,000	05/2018

Enhancing Learning w/ AR	IU-Curriculum Enhancement Grant	Co-I	\$10,000	5/2017
VR to Treat Childhood Anger	IU Collaborative Research Grant	Co-PI	\$60,480	5/2017