

Biomedical Visualization

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Combining art and science to disseminate and illuminate scientific and medical content.

School of Art and Design, College of Visual and Performing Arts, Northern Illinois University



Northern Illinois University

Introduction

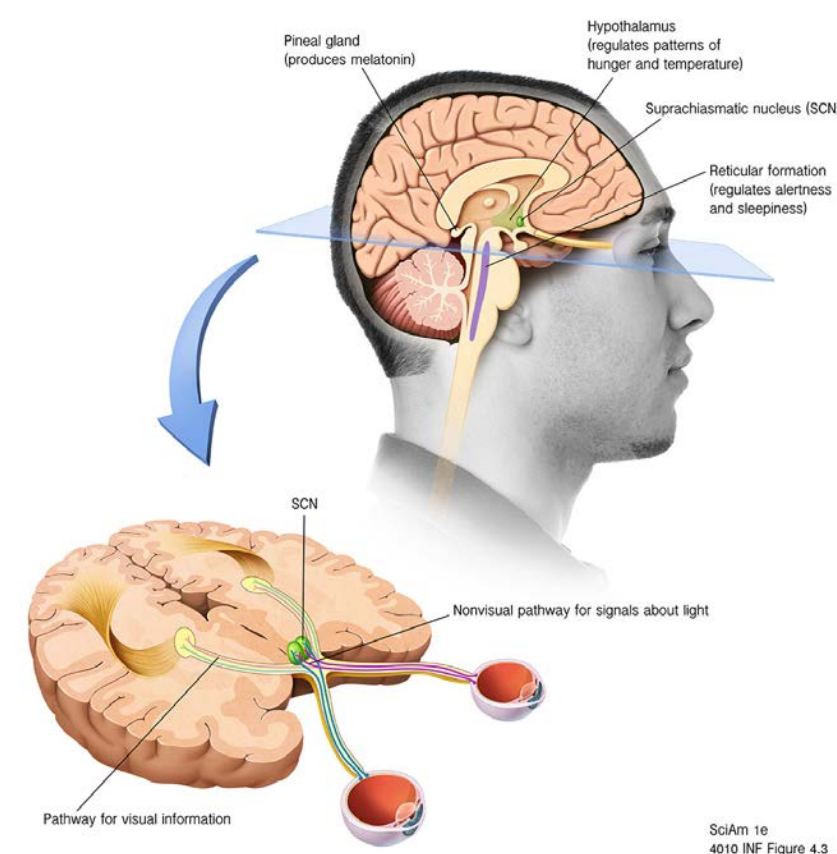
Biomedical Visualization is the term used to describe contemporary medical illustration. It includes illustration, animation, interactive media, VR and haptics, simulators, 3D models, molecular models, data visualization, and more.

Professor Todd Buck's research focuses on the creation of educational and conceptual visuals to help **proliferate understanding of scientific and medical information.**

Audiences include the academic and health science community as well as the general public. Todd's illustrations are published in:

- medical journals
- surgical atlases
- college textbooks
- pharmaceutical and biotech advertising
- patient education websites
- continuing education for health practitioners

Results and Context



Biomedical Visualization is a form of **visual learning** used to:

- teach surgeons and physicians about new procedures, treatments, and medications.
- teach patients about their health and/or disease or injury so they become more proactive in caring for themselves.
- teach and promote the sciences.

Real-world Connections

Every illustration I create has a purpose and an intended audience.

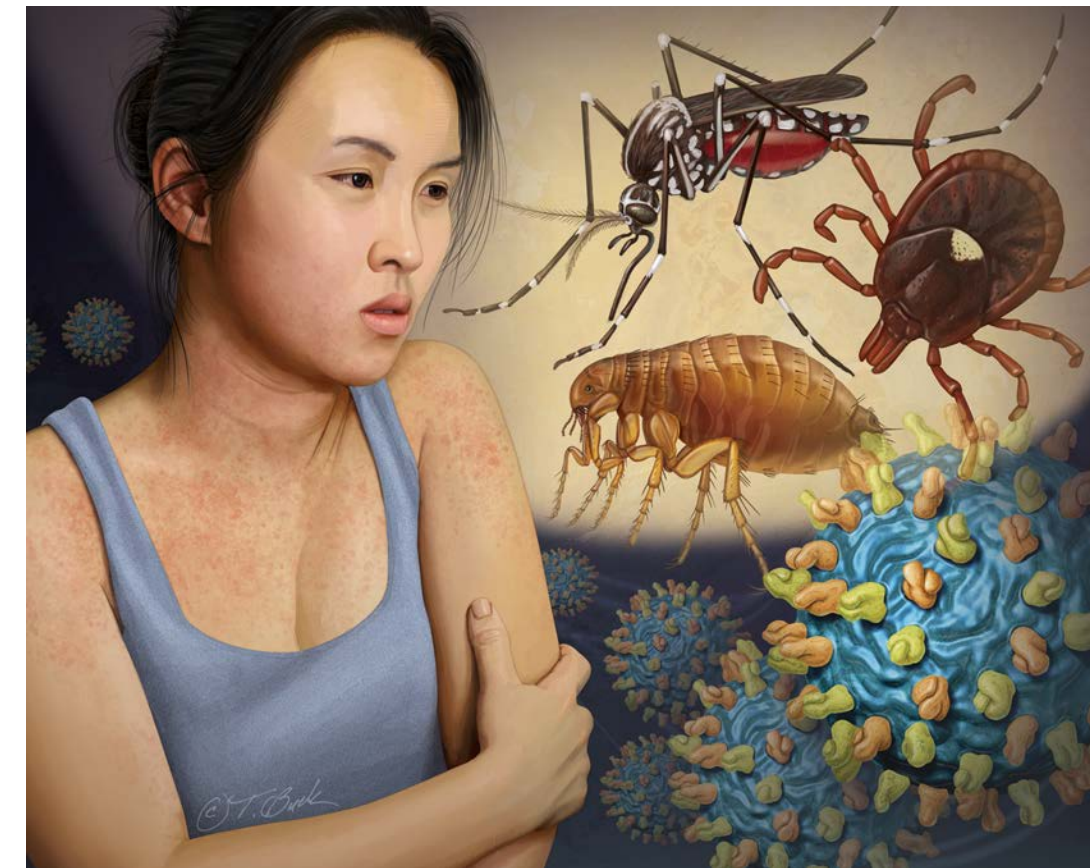
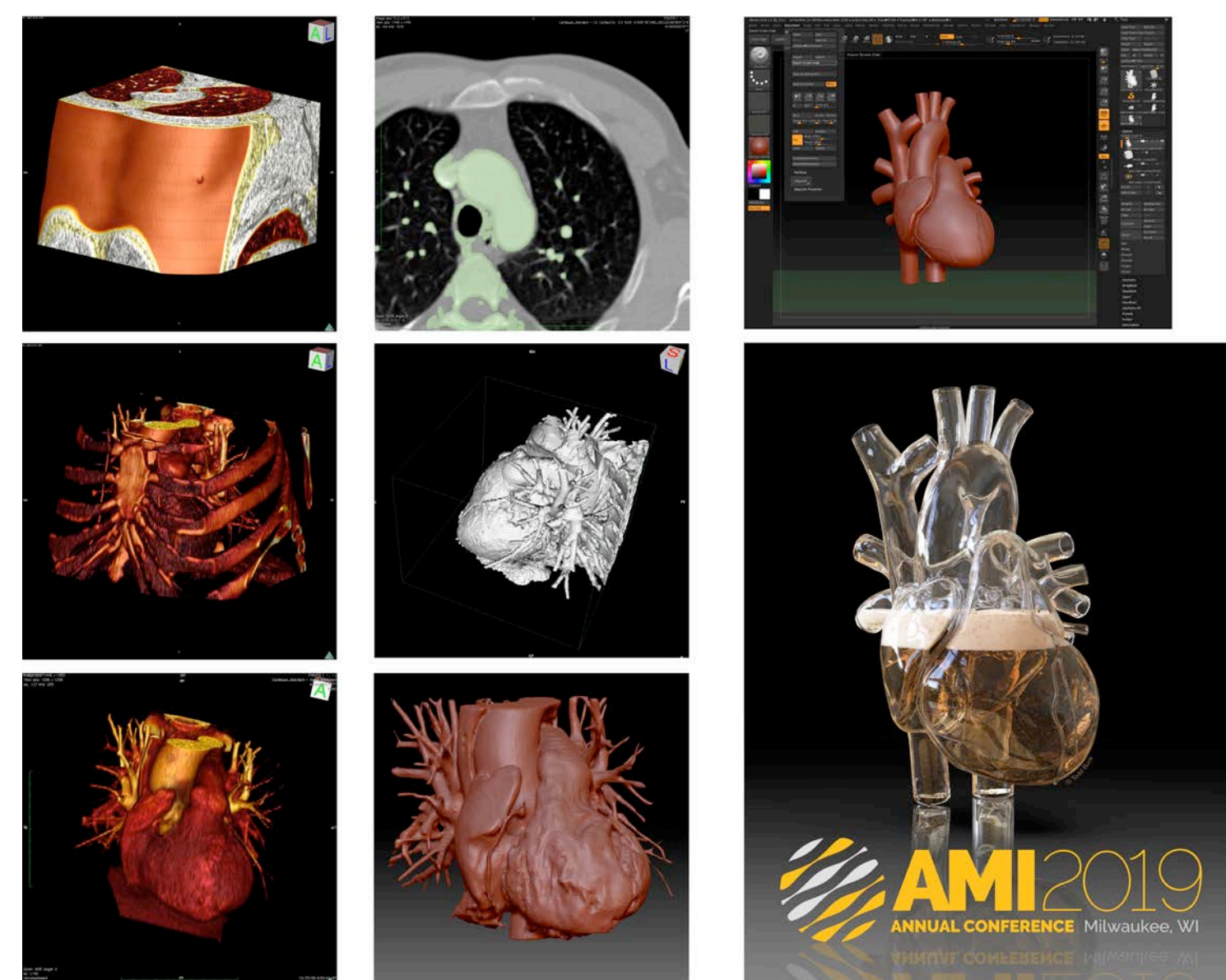


Illustration of Vector-borne Diseases for cover of *American Family Physician*, the leading peer-reviewed journal in primary care. © Todd Buck



Digital 3D model of *Bythotrephes longimanus*, aka spiny-tailed water flea, that is invasive to the Great Lakes and many inland lakes in the Midwest. © Todd Buck



Use of Osirix to create model from DICOM data set. Model imported into Zbrush and turned into poster for Association of Medical Illustrators conference. © Todd Buck

Students: 21st Century Workforce

At NIU, we teach both general illustration and scientific illustration.

BFA illustration alumni are employed in a variety of professions:

- concept artists for games and movies
- illustrators for comic books and graphic novels
- children's book illustrators
- art directors/creative directors at publishing companies and ad agencies
- staff illustrators at museums and zoos
- graphic artists and designers
- product and package designers
- some make a good living selling prints of their work online and at conventions

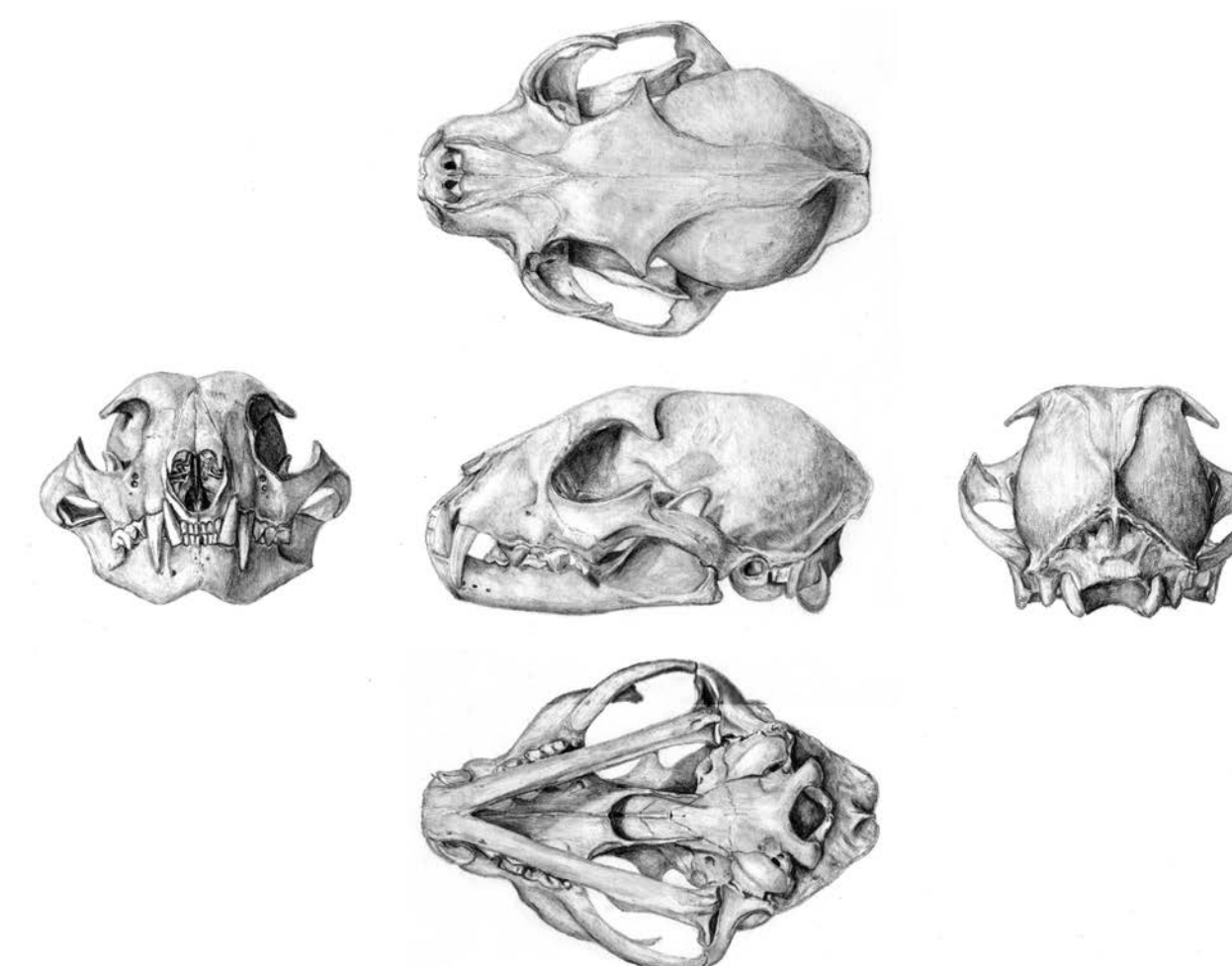


Advanced Illustration portfolio development. © Ki Kline (aka Gawki)



3D digital sculpting with Zbrush and 3D printing. © Lynn Corr

BFA illustration students interested in the sciences often go on to become professional medical illustrators.



Bobcat skull drawing from *Beginning Scientific Illustration*. © Kelley Cappel

Funding and Support

Research in the College of Visual and Performing Arts relies on:

- National Endowment for the Arts (NEA)
- National Endowment for the Humanities (NEH)
- National Science Foundation (NSF)
- STEM Grants
- National Art Education Foundation
- Institute of Education Sciences/Dept. of Ed.
- Illinois Arts Council
- Department of State

Other support for the Arts:

- U.S. Copyright Office (Library of Congress)
- S. 1273 CASE Act of 2019
- Every Student Succeeds Act (ESSA) to include arts indicator for K-12 as part of mandate. Proposal submitted to the Illinois School Board of Education (ISBE).

Collaborators

College of Engineering and Engineering Technology.

Senior design students are paired with senior engineering teams to help design their final projects. This initiative is intended to lead to more collaboration between the schools, and possibly a new academic pathway in industrial design and product design.

Argonne National Laboratory

Joseph Insley, Visualization and Analysis Team Lead at Argonne National Laboratory, is teaching Data Visualization in the School of Art & Design and Computer Science Departments.

Science Department

Illustration students frequently collaborate with science faculty by creating illustrations for their research and publications.

Theatre and Dance

Illustration and Design students collaborate with T&D to create posters for upcoming productions.