

Parker E. Ludwig

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Education and training

Indiana University, Indianapolis, IN Radiology Resident	2021-Present
UnityPoint Health/Central Iowa Health System, Des Moines, IA Transitional Year Resident	2020-2021
Creighton University School of Medicine, Omaha, NE Doctor of Medicine	2020
Brigham Young University, Provo, UT Major: Organ Performance	Bachelor of Music: 2016

Professional Service

Peer reviewer for <i>Theranostics</i>	2019-Present
<ul style="list-style-type: none"> Review articles concerning <i>in vitro</i> diagnostics and prognostics, image-guided therapy, biosensors, personalized and translational medicine, and biomedical research 	
Peer reviewer for <i>The British Journal of Radiology</i>	2021-Present
<ul style="list-style-type: none"> Review articles related to radiology and the underpinning sciences 	

Organizations

Radiological Society of North America	2018-Present
American College of Radiology	2018-Present
American College of Physicians	2018-Present
The Guild of Carillonneurs in North America	2016-Present
American Guild of Organists	2008-Present

Presentations

Ludwig PE, Huff TJ, Bremer K, Nandipati KC. (2020. August) Volume variation with the current standard sleeve gastrectomy technique compared to technique employing pressure-sensitive gastric calibration tube: preliminary testing. Poster presented virtually at the Society of American Gastrointestinal and Endoscopic Surgeons Annual Conference. Cleveland, OH.

Huff TJ, **Ludwig PE**, Bremer K, Nandipati KC. (2020. August) **Pressure-sensitive gastric calibration tube: development.** Poster presented virtually at the Society of American Gastrointestinal and Endoscopic Surgeons Annual Conference. Cleveland, OH.

Huff TJ, **Ludwig PE**, Nandipati KC, Fitzgibbons RJ, Stavas JM. (2020. August) **Crural thickness measurements between intraoperative and 3D printed anatomical models.** Poster presented virtually at the Society of American Gastrointestinal and Endoscopic Surgeons Annual Conference. Cleveland, OH.

Andersen D, **Ludwig P**, Janot A, Angle B. (2019. May) **Intravitreal Injections Among Medicare Part B Beneficiaries, 2012-2016.** Poster presented at the Association for Research in Vision and Ophthalmology Annual Meeting. Vancouver, Canada.

Ludwig PE, Huff TJ, Nandipati KC, Fitzgibbons RJ, Stavas JM. (2019. April) **3D printed anatomical models for preoperative planning of diaphragmatic and abdominal wall hernia repair.** Poster presented at the Midwest Student Biomedical Research Forum. Omaha, NE.

Pflederer N, Horneber E, Wessling D, **Ludwig P**, Huff T, Lambrecht J. (2018. October) **An ultra-sound education: a qualitative analysis of hands-on ultrasound training during preclinical medical education.** Poster presented at The American College of Physicians Abstract Competition. Omaha, NE.

Ludwig PE, Thankam FG, Patil AA, Agrawal DK. (2018. February) **Adult neural stem cell isolation from whole rat brain and neurosphere culture and differentiation.** Poster presentation at the Midwest Student Biomedical Research Forum. Omaha, NE

Publications

Published peer-reviewed articles

1. **Ludwig PE, Huff TJ, Bremer K, Nandipati KC. Pressure-sensing gastric calibration tube for minimizing sleeve volume variation in sleeve gastrectomy compared to the current standard technique.** *Obesity Surgery*. 2020.
2. **Huff TJ, Ludwig PE, Smith CJ, Cramer JA. Neuroimaging findings of delayed post-hypoxic leukoencephalopathy after acute carbon monoxide poisoning.** *American Journal of Neuroradiology, Case of the Week*. 2020.
3. **Ludwig PE, Huff TJ, Helvey JT, Cramer JA. Neuroimaging findings of stroke-like migraine attacks after radiation therapy (SMART) syndrome.** *American Journal of Neuroradiology, Case of the Week*. 2020.
4. **Ludwig PE, Huff TJ, Shanahan MM, Stavas JM. Pregnancy success and outcomes after uterine fibroid embolization: updated review of published literature.** *The British Journal of Radiology*. 2019;93(1105).
5. **Andersen DJ, Ludwig PE, Janot AC. Intravitreal Injections among Medicare Part B Beneficiaries, 2012-2016.** *Journal of VitreoRetinal Diseases*. 2019;3(4).
6. **Huff TJ, Ludwig PE, Salazar D, Cramer JA. Fully automated intracranial ventricle segmentation on CT with 2D regional convolutional neural network to estimate ventricular volume.** *International Journal of Computer Assisted Radiology and Surgery*. 2019;10(X):1-10.
7. **Ludwig PE, Freeman SC, Janot AC. Novel stem cell and gene therapy in diabetic retinopathy, age related macular degeneration, and retinitis pigmentosa.** *International Journal of Retina and Vitreous*. 2019;5(1):7.
8. **Ludwig PE, Patil AA. Adult neural stem cell isolation from whole rat brain and neurosphere culture and differentiation.** *Bratislava Medical Journal*. 2019;120(1):19–25.
9. **Huff TJ, Ludwig PE, Zuniga JM. The potential for machine learning algorithms to improve and reduce the cost of 3-dimensional printing for surgical planning.** *Expert Review of Medical Devices*. 2018;15(5):349-356.
10. **Ludwig PE, Huff TJ, Zuniga JM. The potential role of bioengineering and three-dimensional printing in curing global corneal blindness.** *Journal of Tissue Engineering*. 2018;9(X):X.
11. **Ludwig PE, Thankam FG, Patil AA, Chamczuk AJ, Agrawal DK. Brain injury and neural stem cells.** *Neural Regeneration Research*. 2018;13(1):7-18.

12. **Ludwig PE**, Patil AA, Chamczuk AJ, Agrawal DK. **Hormonal therapy in traumatic spinal cord injury.** *American Journal of Translational Research.* 2017;9(9):3881-3895.

Published StatPearls articles

1. **Ludwig PE**, Sevensma K. **Anatomy, Head and Neck, Eye Cornea.** In: *StatPearls.* Treasure Island (FL): StatPearls Publishing; 2018. <http://www.ncbi.nlm.nih.gov/books/NBK470340/>.
2. **Ludwig PE**, Czyz CN. **Anatomy, Head and Neck, Eye Muscles.** In: *StatPearls.* Treasure Island (FL): StatPearls Publishing; 2017. <http://www.ncbi.nlm.nih.gov/books/NBK470534/>.
3. **Ludwig PE**, Czyz CN. **Embryology, Eye, Malformations.** In: *StatPearls.* Treasure Island (FL): StatPearls Publishing; 2017. <http://www.ncbi.nlm.nih.gov/books/NBK482496/>.
4. **Ludwig PE**, Bhimji SS. **Histology, Glial Cells.** In: *StatPearls.* Treasure Island (FL): StatPearls Publishing; 2017. <http://www.ncbi.nlm.nih.gov/books/NBK441945/>.
5. **Ludwig PE**, Varacallo M. **Neuroanatomy, Central Nervous System (CNS).** In: *StatPearls.* Treasure Island (FL): StatPearls Publishing; 2017. <http://www.ncbi.nlm.nih.gov/books/NBK442010/>.
6. **Ludwig PE**, Varacallo M. **Neuroanatomy, Neurons.** In: *StatPearls.* Treasure Island (FL): StatPearls Publishing; 2017. <http://www.ncbi.nlm.nih.gov/books/NBK441977/>.
7. **Ludwig PE**, Czyz CN. **Physiology, Eye.** In: *StatPearls.* Treasure Island (FL): StatPearls Publishing; 2017. <http://www.ncbi.nlm.nih.gov/books/NBK470322/>.

Research and inventions

Developed light and sound source for gamma-frequency entrainment **2019-2020**
Solo inventor

- Created a device that employs a 110-220V alternating current power source through a standard lightbulb base, and produces light and sound stimuli at 40Hz
- Based on recently published research on the benefits of gamma entrainment using sensory stimulus (GENUS) in Alzheimer's mouse models
- Iterative design of multiple prototypes
- "Ambient Gamma Wave Frequency Light and Sound Source," U.S. Provisional Pat. Ser. No. 62857158, filed 04-June-2019.

Developed pressure-sensitive gastric calibration tube **2018-2020**
Creighton University School of Medicine
In coordination with KC Nandipati, MBBS

- Made force-sensitive resistors
- Designed circuit and custom PCB incorporating Arduino Nano and Honeywell pressure sensors in multiple iterations

- Iterative design of multi-lumen tubes
- Designed and built balloons in various sizes and shapes
- Tested in explants
- “Pressure Sensitive Gastric Calibration Tube,” U.S. Provisional Pat. Ser. No. 62806933, filed 18-Feb-2019.

3D printing anatomical models for surgical planning **2018-2020**

Creighton University School of Medicine, Departments of Radiology and Surgery,

University of Nebraska at Omaha, Department of Biomechanics

Under the supervision of RJ Fitzgibbons, MD; KC Nandipati, MBBS; JM Stavas, MD; and JM Zuniga, PhD

- Segmented 3D models from CT scans for diaphragmatic and abdominal wall hernias, and convert to STL for 3D printing
- Led coordination and communication between radiology and surgery departments and the 3D printing lab

Estimating brain ventricle volumes with machine learning model **2018-2020**

University of Nebraska Medical Center, Department of Radiology

Under the supervision of JA Cramer, MD

- A 2D convolutional neural network performed fully-automated ventricular segmentation on CT images
- Used 300 normal head CTs
- Accurate volume congruence
- Respectable Dice scores

In vitro neural stem cell isolation, culture, and differentiation **2017**

Creighton University School of Medicine, Department of Clinical and Translational Science

Under the supervision of DK Agrawal, PhD; and FG Thankam, PhD

- Developed effective protocol for isolating and culturing neural stem cells from adult rat brains
- Induced differentiation into astrocytic and neuronal lineages
- Confirmed with immunofluorescence

Investigation of alpaca digestive system **2012, 2014-2016**

Brigham Young University, Department of Plant and Wildlife Sciences

Under the supervision of TF Robinson, PhD

- Assisted with second chamber fistulations
- Prepared various feed samples
- Analyzed digested feed samples
- Analyzed urine, blood, and fecal samples using mass spectrometry and ELISA

Additional employment history

President and Owner **2020-Present**
SKAPPA, LLC

- Provide fetal 3D printing services to independent 3D/4D prenatal ultrasound facilities.

Organist **2020**
St. Paul Lutheran Church, Treynor, IA

- Played the organ for traditional Sunday morning services
- Accompanied a variety of hymns and liturgy

Yamaguchi Scholar, Summer Research Fellow **2017**
Creighton University School of Medicine, Department of Clinical and Translational Science

- Conducted bench research with neural stem cells from rats
- Performed a variety of lab techniques including immunofluorescence; tissue fixation, preparation, and staining; cell isolation, culture, and differentiation; manual and automated cell counting protocols; and migration assays

University Carillonneur **2010-2012, 2014-2016**
Brigham Young University

- Performed daily, 30-minute recitals on the 52-bell carillon
- Gave tours of the tower when requested to educate the community about the instrument and its history

Organ teacher and church organist **2008-2016**

- Taught private organ lessons for the Brigham Young University Organ Department
- Played for Baptist, Presbyterian, Roman Catholic, Methodist, and Episcopal services

Medical records **2010**
Intermountain ENT Center

- Scanned and organized patient charts

Leadership

Co-president, Radiology Interest Group, **2019-2020**
Creighton University School of Medicine

- Planned and conducted meetings designed to introduce medical students to radiology, explore careers in the field, and outline the application and preparation process

Co-president, Ultrasound Interest Group, **2019-2020**
Creighton University School of Medicine

- Planned and conducted point-of-care ultrasound training sessions for first- and second-year medical students

- Taught about the basics of ultrasound technique, types of probes, image orientation, and cardiac, lung, abdominal, and vascular imaging
- Facilitated hands-on sessions with small groups of students

Organ workshop coordinator in various communities **2014-2016**

- Coordinated and taught at multiple single-day organ workshops
- Hundreds of attendees in total

Supervisor, Friday's Kids Respite, Orem **2015-2016**

- Assigned volunteers to children
- Oversaw all activities

Community Service

Church Organist, Salt Lake City, Provo, Orem, Omaha, Des Moines **2008-Present**

- Play weekly for services and community events of the Church of Jesus Christ of Latter-day Saints

Church Auxiliary Pianist, Salt Lake City, Provo, Madagascar, Omaha **2008-Present**

- Play for church services

Food Packet Preparation, Des Moines **2021**

- Prepared packets of food for *Meals from the Heartland*

Flood Relief, Pacific Junction **2019**

- Performed demolition and restoration work on flooded home

Flood Relief, Glenwood **2019**

- Stocked flood relief site and helped victims locate the supplies they needed

Magis Clinic, Omaha **2017-2019**

- Volunteered in Acute Care and Mental Health clinics

HS MACA Eye Presentation and Dissection, Omaha **2018**

- Taught middle school students about the function and structure of the human eye in conjunction with The Health Sciences Multicultural and Community Affairs Department (HS-MACA)
- Led the students through a cow eye dissection

Carillon Lessons, Omaha **2018**

- Provided free lessons to motivated students

Brush Up Nebraska, Omaha **2017**

- Painted houses for individuals selected by the program based on need

One Sight Vision Clinic, Omaha **2017**

- Helped local ophthalmologists perform vision screenings for elementary and middle school children

Tutoring Refugees, Omaha **2017**

- Met with 3rd grade and 5th grade brothers from Myanmar to help with math and English

YES Mentoring, Omaha **2016-2017**

- Met with a youth requesting a role model/mentor

Utah Valley Regional Medical Center, Radiology **2014-2016**

- Transported and positioned patients for CT scans each week
- Friday's Kids Respite, Orem **2014-2016**
- Watched and entertained special-needs children on Friday and Saturday nights weekly to give their parents a chance to run errands
- Church Mission, Madagascar **2012-2014**
- Taught English weekly to people in the cities of Toamasina, Antananarivo, Manandona, and Fianarantsoa
 - Helped local farmers plant beans, rice and potatoes in rural areas around Manandona and Antsirabe
 - Oversaw the work of a dozen missionaries in one city, and two dozen in another
 - Worked with the individual missionaries to provide guidance on lesson planning and teaching
 - Conducted regular meetings
 - Trained new missionaries one-on-one for three months each
 - Taught Malagasy grammar, vocabulary, and pronunciation
 - Provided insight into local customs and laws
 - Offered recommendations on effective teaching techniques
- Friday's Kids Respite, Salem **2012**
- Watched and entertained special-needs children on Friday nights to give their parents a chance to run errands

Awards

- Carillonneur Member Recognition** **2016**
The Guild of Carillonneurs in North America (GCNA) Congress, Yale University
- The highest level of membership conferred by the GCNA
 - Involves two stages of judged performances, and significant manuscript preparation
- 1st place, Regional Competition for Young Organists** **2011**
American Guild of Organists
- Regional competition for organists under the age of 22
- High School Student Award,** **2010**
John R. Rodland National Memorial Competition in Organ Playing
- National scholarship competition open to organists pursuing a degree in Organ Performance
- 3rd Place, Regional Competition for Young Organists** **2009**
American Guild of Organists
- Regional competition for organists under the age of 22

Hobbies, Interests, and Additional Skills

Play the organ and carillon

- Notable recitals:
 - **Noon Organ Recitals.** The Tabernacle at Temple Square. Salt Lake City: December 24, 2017; July 3, 2016; June 5, 2016; February 28, 2016; February 21, 2016; February 13, 2016.
 - **Holiday Celebration Recital.** Henningson Memorial Campanile, University of Nebraska. Omaha: December 14, 2019; December 16, 2017.
 - **Summer Carillon Recital Series.** Christ Church Cranbrook. Bloomfield Hills: August 6, 2017.
 - **Summer Carillon Series.** Kirk in the Hills. Bloomfield Hills: August 6, 2017.
 - **2017 Summer Recital Series.** Millennium Carillon, Naperville Park District. Naperville: August 1, 2017.
 - **Carillon Concert Series.** Theodore C. Butz Carillon, Chicago Botanic Garden. Glencoe: July 31, 2017.
 - **The Bells of Summer, 52nd Season.** Rockefeller Memorial Chapel, The University of Chicago. Chicago: July 30, 2017.
 - **Eighth Annual Carillon Summer Recital Series.** The Carl M. Williams Carillon, The University of Denver. Denver: July 23, 2017.
 - **Courtyard Carillon Concert.** First-Plymouth Church. Lincoln: May 20, 2017.
 - **America's Freedom Festival Carillon Concert.** The BYU Centennial Carillon, Brigham Young University. Provo: June 24, 2016.
 - **The Guild of Carillonneurs in North America Congress.** The Yale Memorial Carillon, Yale University. New Haven: June 17, 2016.
 - **Senior Recital.** The Tabernacle at Temple Square. Salt Lake City: March 29, 2016
 - **Utah Valley American Guild of Organists Super Saturday Recital.** Madsen Recital Hall, Brigham Young University. Provo: April 21, 2012.
 - **Sophomore Recital.** First Baptist Church. Salt Lake City: November 11, 2011.

Fluent in Malagasy

- Proficient in Teny Merina, Betsileo, and Betsimisaraka (3 different dialects)

Computer and electronics experience

- Image Segmentation
- 3D printing and anatomical modeling
- Computer-aided design (CAD)
- Various projects with Arduino and Raspberry Pi boards and other microcontroller units
- Custom PCB design and population
- Ruby, Python, C++, Markdown, HTML and CSS

Familiar with the processes of applying for provisional and non-provisional patents

Fly a paramotor or powered paraglider