ANDREA S. KIM, MS

BIOMEDICAL VISUALIZATIONS | MEDICAL AR/VR DEVICES

CONTACT

Website www.andreaseung.com

Phone +1 (703) 399-5815

Email andrea.kim@fda.hhs.gov
andreakim39@gmail.com

Address 44 Nicole Court
Old Forge, PA 8518

PROFILE

I am an interactive designer and developer, medical 3d artist, and a researcher of augmented and virtual reality (XR) applications in medicine. My personal and profesional goals involve providing indisciplinary skills for creating and evaluating robust, visual solutions within the biomedical community. I am committed to patient safety, scientific accuracy, and excellence in design.

PROFICIENCIES

- Interactive Developing Platforms
  - Unity 3D
  - Unreal Engine 4
  - OpenXR
- Computer Programming Languages
  - C#, C++, Processing
  - HTML, CSS, Javascript
  - R, Python
- 3D Modeling & Rendering Software
  - Pixologic ZBrush
  - Autodesk 3D Studio Max
  - Autodesk Mudbox
  - KeyShot Render
  - Substance Painter & Designer
  - Visual Molecular Dynamics
  - Materialise Mimics
  - itk-SNAP
- 2D Illustration & Design Software
  - Adobe Photoshop
  - Adobe Illustrator
  - Adobe InDesign

EDUCATION

AUG 2016 - NOV 2018

University of Illinois at Chicago, Chicago, IL
M.S. in Biomedical Visualization
Thesis Title: Development of Virtual Reality Applications in Anatomical Education of the Hand and Forearm
Advisor: Cristian J. Luciano, Ph.D., UIC Bioengineering Dept.

SEP 2009 - MAR 2013

Northwestern University, Evanston, IL
B.A. in Psychology (Major)
Chinese Language & Culture (Minor)
Concentration in Pre-Medicine

JUN 2012 - AUG 2012

Peking University (Study Abroad), Beijing, China
Concentration in Traditional Chinese Medicine and Public Health in China

WORK EXPERIENCE

MAR 2020 - PRESENT

U.S. Food & Drug Administration, Silver Spring, MD
Medical AR/VR Staff Fellow
Division of Imaging, Diagnostics, and Software Reliability / OSEL / CDRH
Consult for medical device regluatory submissions related to color performance in endoscopic and medical extended-reality (XR) devices.
Design bench test methodologies for characterization of XR devices within context of medical applications.
Evaluate reliability and performance of software rendering systems and optical properties associated with 3D head-mounted displays (HMDs).
Develop XR cross-platform applications in Unity and OpenXR.
Lead social focus group activities for the division.

NOV 2018 - MAR 2020

U.S. Food & Drug Administration, Silver Spring, MD
Medical AR/VR ORISE Fellow
Division of Imaging, Diagnostics, and Software Reliability / OSEL / CDRH
Designed bench test methodologies for characterization of XR devices within context of medical applications.
Evaluateed reliability and performance of software rendering systems and optical properties associated with 3D HMDs.
Developed XR cross-platform applications in Unity as needed for research needs in the medical XR program.

DEC 2013 - JUL 2016

Northwestern University, Feinberg School of Medicine, Chicago, IL
Certified Clinical Research Coordinator
Department of Surgery, Clinical Trials Unit
Led execution of 11 observational and interventional cardiology clinical research trials.
Managed screening, consenting, and follow-up of trial subjects.
Attended cases in the operating room and guided the surgeon in study-specific cardiac ablation lesions during open-heart surgery.
Took vitals, reviewed medications, assigned NYHA classifications, and reported any adverse events or symptoms of trial subjects.

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GALLERY EXHIBITIONS

June 4, 2021
Group Exhibition:
Spring FDA Virtual Art Exhibition
White Oak Art Gallery
Virtual, Silver Spring, MD

March 16, 2018 - May 6, 2018
Group Exhibition:
Art with Heart
International Museum of Surgical Science, Chicago, IL

April 1, 2017 - May 7, 2017
Group Exhibition:
Inside the World of Medical Art
International Museum of Surgical Science, Chicago, IL

CERTIFICATIONS

Certified Clinical Research Coordinator
Issued 2015 - 2017 by the Association of Clinical Research Professionals

Venipuncture
Issued 2013 by Northwestern Memorial Hospital, Chicago, IL

FDA ACTIVITIES

Chair, Divisional Social Focus Group
Mar 2021 - Present
Division of Imaging, Diagnostics, and Software Reliability (DIDSR)

Member, FDA Art Club
Jan 2020 - Present

Member, FDA Fellows Association
Dec 2018 - Present

UNIVERSITY ACTIVITIES

Social Chair, Executive Board Member
May 2017 - May 2018
Student Association of Medical Artists
University of Illinois at Chicago

Coxswain
Sept 2009 - Mar 2013
Varsity Men's Rowing Team
Northwestern University

Member, Service Fraternity
Sept 2010 - Jun 2011
Alpha Phi Omega
Northwestern University

WORK EXPERIENCE cont.

MAY 2013 - NOV 2013

Northwestern University, Feinberg School of Medicine, Chicago, IL
Research Project Coordinator
Department of General Internal Medicine
Performed venipuncture and ankle-brachial index measurements.
Ensured completion of study activities per protocol for intervential drug tial, maintained analysis and evaluation of data.
Administered functional performance measures of study patients, such as mini mental status questionnaires, balance and walking tests.

SEPT 2011 - APR 2013

The Family Institute at Northwestern University, Evanston, IL
Research Assistant
Focus: Generalized Anxiety Disorder (GAD) and Depression
Trained to code interactions using Structural Analysis of Social Behavior.
Code and transcribe videos of clients as an assessment tool to describe dyadic social interactions between couples with GAD or depression.

AWARDS

FEBRUARY 12th, 2020

Office of Science and Engineering Laboratories Quarterly Recognition Award, Center for Devices and Radiological Health
U.S. Food & Drug Administration, Silver Spring, MD
Presented by Edward Margerrison, Ph.D., Director of Office of Science and Engineering Laboratories, FDA

JANUARY 29th, 2019

1st Place in Serious Games & Virtual Environments
Best in Show Award for Student Category
IMSH 2019 SimVentors Showcase, San Antonio, TX
Society for Simulation in Healthcare
Project Title: Virtual Reality Training Simulation for Learning Hands and Forearm Anatomy
Advisor: Cristian J. Luciano, Ph.D.

APRIL 19th, 2018

2018 Chancellor's Student Service and Leadership Award
University of Illinois at Chicago, Chicago, IL
Presented by Chancellor Amiridis at 46th Annual Awards

PUBLICATIONS

FEBRUARY 2021

Andrea S. Kim, Wei-Chung Cheng, Ryan Beams, Aldo Badano. "Color Rendering in Mixed-Reality Medical Applications." Journal of Digital Imaging, 34, pp. 16-26.

FEBRUARY 2021

Andrea S. Kim, Wei-Chung Cheng, Ryan Beams, Aldo Badano. "Spatiotemporal characteristics of medical extended-reality systems." SPIE Medical Imaging 2021: Image Perception, Observer Performance, and Technology Assessment, 11599-06.

MARCH 2020

Ryan Beams, Brendan Collins, **Andrea S. Kim**, Aldo Badano. "Angular dependence of the spatial resolution in virtual reality displays." IEEE Conference on Virtual Reality and 3D User Interfaces (VR), pp. 836-841.

FEBRUARY 2020

Ryan Beams, **Andrea S. Kim**, Aldo Badano. "Eyebox centering using chromatic aberrations of virtual reality head-mounted displays." Optical Architectures for Displays and Sensing in Augmented, Virtual, and Mixed Reality (AR, VR, MR), 11310-09.

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PROFESSIONAL SOCIETY

Optical Society of America
2020 - 2021
Association of Medical Illustrators
2016 - 2020

PROFESSIONAL SERVICE

Congressional Tour at FDA, CDRH
June 21, 2021
AR/VR Lab Demonstrator for Senator Baldwin (D-WI) and staff
USA Science & Engineering Festival (Virtual)
Sept 26, 2020 - Oct 3, 2020
Virtual Exhibitor for FDA Office of Science and Engineering Laboratories
Maryland Department of Commerce Tour
January 13, 2020
AR/VR Lab Demonstrator for Maryland Secretary of Commerce Kelly Schulz
IEEE Women in Engineering Career Fair
November 22, 2019
Career Fair Exhibitor for FDA Office of Science and Engineering Laboratories
FDA Commissioner Tour at CDRH
September 9, 2019
AR/VR Lab Demonstrator for FDA Commissioner Norman Sharpless
Congressional Tours at FDA, CDRH
May 29, 2019 - September 18, 2019
AR/VR Lab Demonstrator for members from Congress, Office of Legislation, Office of Management and Budget, Senate Appropriations Committee

VOLUNTEERING

Community Emergency Response Team
April 2014 - July 2016
Disaster and Humanitarian Relief. Trained by the Northwestern University Police Department in disaster psychology and medical operations.

LANGUAGES

Proficient in English

Proficient in Korean

Intermediate in Mandarin Chinese

PUBLICATIONS cont.

SEPTEMBER 2019

Ryan Beams, **Andrea S. Kim**, Aldo Badano (2019, September). "Measurement of transverse chromatic aberrations in virtual reality headsets." Frontiers in Optics + Laser Science APS/DLS, pp. JW3A-88. OSA Technical Digest (Optical Society of America).

SEPTEMBER 2019

Ryan Beams, **Andrea S. Kim**, Aldo Badano (2019, September). "Transverse chromatic aberration in virtual reality head-mounted displays." Optics Express, 27(18), pp. 24877-24884.

JUNE 2019

Ryan Beams, **Andrea S. Kim**, Wei-Chung Cheng, Aldo Badano (2019, June). "38-1: Transverse chromatic aberrations in virtual reality devices." SID Symposium Digest of Technical Papers, 50(1), pp.524-526.

POSTER PRESENTATIONS

MARCH 2020

Andrea S. Kim, Ryan Beams, Ellenor Brown, Wei-Chung Cheng, Kyoko Fujimoto, Janell Joyner, Kimberly Kontson, Paul Lemaillet, Trent Robertson, and Aldo Badano (2020, March). "Medical Extended Reality (MXR) Research at the U.S. Food & Drug Administration." Poster Session presented at the 2020 FDA Public Workshop - Medical Extended Reality: Toward Best Evaluation Practices for Virtual and Augmented Reality in Medicine, Silver Spring, M.D.

SEPTEMBER 2019

Ryan Beams, **Andrea S. Kim**, Wei-Chung Cheng, Aldo Badano (2019, September). "Display performance characterization of virtual and augmented reality devices for medicine." Poster Session presented at the 2019 FDA Science Forum, Silver Spring, M.D.

JUNE 2019

Andrea S. Kim, Ryan Beams, Wei-Chung Cheng, Aldo Badano (2019, June). "Colour effects in the rendering of mixed-reality scenes." Poster Session presented at the CIE 2019 29th Quadrennial Session, Washington, D.C.

AUGUST 2017

Andrea S. Kim (2017, August). "Heart medicine inspired by Saw-Scaled Viper (Echis carinatus)." Poster Session Presented at the the Association of Medical Illustrators 2017 Annual Conference, Austin, T.X.

TALKS

FEBRUARY 2021

Andrea S. Kim, Wei-Chung Cheng, Ryan Beams, Aldo Badano (2021, February). "Spatiotemporal Characteristics of Medical Extended-Reality Systems." SPIE Medical Imaging Conference 2021, Virtual.

SEPTEMBER 2020

Andrea S. Kim (2020, September) Speaker, Plenary Talk, "Medical AR/VR Applications: Evaluation Challenges and Research at FDA." Association of Medical Illustrators 2020 Annual Conference, Virtual.

AUGUST 2020

Andrea S. Kim (2020, August) Invited Panelist, "The Future of Spatial Computing in Healthcare." MedVR VR & AR Symposium and Hackathon in Healthcare, Featured Online Talk.

AUGUST 2020

Andrea S. Kim (2020, August). "Performance characterization of medical extended reality head-mounted displays." Seminar presented at the 2020 FDA Fellows Association Seminar Series, Silver Spring, M.D.

JULY 2019

Andrea S. Kim (2019, July). "Augmented & Virtual Reality in Medicine." 30-minute seminar presented at the 2019 FDA Fellows Association Summer Seminar Series, Silver Spring, M.D.