Vuthea CHHEANG

Postdoctoral Research Staff, Center for Applied Scientific Computing
Lawrence Livermore National Laboratory

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SUMMARY

My expertise areas are *Virtual and Augmented Reality, Human-Computer Interactions, and Visualization*. My research interests include *interaction and visualization techniques*, *collaborative environments*, where multiple users can interact and collaborate seamlessly, and *medical visualization* for medical planning, training, and interprofessional team collaboration.

EDUCATION

11/2018 - 08/2022 **Doctor of Engineering** **Otto-von-Guericke University Magdeburg, Germany**
Major: *Computer Science*, Grade: *Magna Cum Laude*
Dissertation: Collaborative Virtual Reality for Laparoscopic Liver Surgery Training and Planning
Advisor: Prof. Christian Hansen, Committee: Prof. Dr. Bernhard Preim, Prof. Dr. Bernhard Jung, Prof. Dr. Nigel John

03/2016 - 02/2018 **Master of Engineering** **Chungbuk National University, South Korea**
Major: *Computer Science*, Grade: *4.35/4.5*
Thesis: Design and Implementation of Live Actor and Entity Representation System in 360° Virtual Reality Scene
Advisor: Prof. Dr. Kwan-Hee Yoo, Committee: Prof. Dr. Jang-Eui Hong, Prof. Dr. Aziz Nasridinov

10/2011 - 03/2015 **Bachelor of Science** **Royal University of Phnom Penh, Cambodia**
Major: *Computer Science and Engineering*, Grade: *3.83/4.0*

PROFESSIONAL EXPERIENCE

07/2023 - Current **Postdoctoral Research Staff** **Lawrence Livermore National Laboratory, Livermore, CA, USA**
· Center for Applied Scientific Computing. Advisor: Dr. Brian Gallagher, Mentor: Dr. Haichao Miao
· Research project: Virtual Inspection of Advanced Manufacturing via Process-Scale Digital Twins, *LDRD Strategic Initiative (LDRD-SI 23-SI-003)*

09/2022 - 07/2023 **Postdoctoral Researcher** **University of Delaware, Newark, DE, USA**
· Department of Computer & Information Sciences. Advisor: Dr. Roghayeh (Leila) Barmaki
· Research project: Virtual Therapy for Extremity Rehabilitation

11/2018 – 09/2022 **Research Scientist** **Otto-von-Guericke University Magdeburg, Magdeburg, Germany**
· Faculty of Computer Science and Research Campus STIMULATE. Advisors: Prof. Dr. Christian Hansen and Prof. Dr. Bernhard Preim. Mentor: Dr. Patrick Saalfeld
· Research Project: Development of augmented and virtual multi-user applications for medical-technical exchange in immersive spaces (AVATAR)
· Research Project: Virtual Reality-based emergency simulation for medical education and training
· Industrial Project: Development of Augmented Reality QR code tracking technique integrating with web-based scene management platform. Company: 3DQR GmbH, Germany.
· Industrial Project: Development of mesh conversion tool to support CAS-One IR file format. Company: CASCINATION AG, Switzerland.

02/2016 – 11/2018 **Research Assistant** **Chungbuk National University, Cheongju, South Korea**
· Department of Computer Science. Advisor: Prof. Dr. Kwan-Hee Yoo
· Research Project: Live Actor and Entity Representation in Mixed and Augmented Reality

03/2015 – 02/2016 **Software and Web Development Instructor** **Korea Software HRD Center, Phnom Penh, Cambodia**
· Training software professionals in cooperation with Korea International Cooperation Agency (KOICA) and South Korean company (Webcash). Advisor: Dr. Tae-Kyung Kim

08/2013 – 04/2014 **Graphic and Web Development Intern** **Mapring Co. Ltd, Phnom Penh, Cambodia**
· Graphical mockups and template design for mobile and web applications.

05/2013 – 08/2013 **Web Development Intern** **EA Cambodia, Phnom Penh, Cambodia**
· Data entry, developing, and maintaining web-based e-commerce systems.

02/2012 – 05/2013 **Editorial Assistant** **Computer Magazine (CM), Phnom Penh, Cambodia**
· Managing reports, press releases, and new articles related to innovated ICTs.

12/2011 – 02/2012 **Freelance Writer** **Computer Magazine (CM), Phnom Penh, Cambodia**
· Writing reports and press releases for a local computer magazine in Cambodia.

AWARDS & SCHOLARSHIPS

2024   **Best Paper Honorable Mention, IEEE AIxVR**   **Link**
Towards Anatomy Education with Generative AI-based Virtual Assistants in Immersive Virtual Reality Environments, IEEE International Conference on Artificial Intelligence & extended and Virtual Reality (AIxVR)

2024   **Noteworthy Achievement Award**
Lawrence Livermore National Laboratory

2023   **Best Paper Award, IEEE/ACM CHASE**   **Link**
Virtual Therapy Exergame for Upper Extremity Rehabilitation Using Smart Wearable Sensors, IEEE/ACM international conference on Connected Health: Applications, Systems and Engineering Technologies (CHASE)

2023   **Nominated for Post-doctoral Research Excellence Award**
University of Delaware

2016   **Scholarship Holder**
Chungbuk National University, Cheongju, South Korea

2014   **Scholarship Holder**
Korea Software HRD Center, Phnom Penh, Cambodia

TEACHING EXPERIENCE

SS 2021   **Teaching Assistant, Virtual and Augmented Reality**
Otto-von-Guericke University Magdeburg, Germany

WS 2019   **Teaching Assistant, Human-Computer Interfaces in Medicine**
Otto-von-Guericke University Magdeburg, Germany

08/2015 – 01/2016   **Software Development**
Korea Software HRD Center, Cambodia

04/2015 – 08/2015   **Web Development**
Korea Software HRD Center, Cambodia

MENTORING & ADVISING

- **VR/AR Technical Cohort** (2024) – Summer intern students, Computing, Lawrence Livermore National Laboratory.

- **Group project mentoring** (2023) – Introduction to Human-Computer Interaction (CISC849), University of Delaware, USA. Topic: Using Generative AI-based Virtual Assistant for Anatomy Education.

- **Sydney Segear** (2023) – Mentoring and guiding conducting user study and research paper writing: Visual Feedback and Guided Balance Training in the Immersive Virtual Reality Environment for Lower Extremity Rehabilitation, University of Delaware, USA.

- **Lauren Baron** (2023) – Mentoring and guiding research paper writing: Virtual Therapy Exergame for Upper Extremity Rehabilitation Using Smart Wearable Sensors, University of Delaware, USA.

- **Robert Brueggemann** (2022) – Individual project mentoring: Virtual Resection Planning using Bezier Surface Interactions in Collaborative VR Environments, Otto-von-Guericke University Magdeburg, Germany.

- **Group project mentoring** (2022) – Teamproject: Computer-Assisted Surgery, Otto-von-Guericke University Magdeburg, Germany. Topic: VR-based emergency simulation for medical training.

- **Vikram Apilla** (2021) – Individual project mentoring: Collaborative VR for Liver Surgery Planning using Wearable Data Gloves: An Interactive Demonstration, Otto-von-Guericke University Magdeburg, Germany.

- **Virve Fisher** (2019) – Bachelor Thesis: Interprofessional Multi-User Virtual Reality Training for Anesthesia in a Laparoscopic Setting, Otto-von-Guericke University Magdeburg, Germany.

PUBLICATIONS

JOURNAL ARTICLES

2024   **Chheang, V.**, Narain, S., Hooten G., Cerda, R.W., Au, B., Weston, B.T., Giera, B., Bremer, P.T. and Miao, H., 2024. Enabling Additive Manufacturing Part Inspection of Digital Twins via Collaborative Virtual Reality. Scientific Reports, 14(1), p.29783. Link

2024   Huber, T., Huettl, F., Vradelis, L., Tripke, V., Schott, D., **Chheang, V.**, Saalfeld, P., Allgaier, M., Saalfeld, S., Preim, B. and Hansen, C., 2024. Virtual Reality in der Leberchirurgie–Planen, Weiterbilden, Prüfen [Virtual reality in liver surgery-Planning, advanced training, testing]. Die Chirurgie, pp.1-7. Link

2024 **Chheang, V.**, Schott, D., Saalfeld, P., Vradelis, L., Huber, T., Huettl, F., Lang, H., Preim, B. and Hansen, C., 2024. Advanced liver surgery training in collaborative VR environments. Computers & Graphics, 119, p.103879. Link

2024 Segear, S.*, **Chheang, V.***, Baron, L., Li, J., Kim, K. and Barmaki, R.L., 2024. Visual feedback and guided balance training in an immersive virtual reality environment for lower extremity rehabilitation. Computers & Graphics, 119, p.103880. *_**Segear, S. and Chheang, V. – joint first authorship**_. Link

2024 Hanke, L.I., Schulte, R., Boedecker, C., Huettl, F., Saalfeld, P., **Chheang, V.**, Wessels, M., von Castell, C., Hecht, H., Hansen, C. and Lang, H., 2024. Influence of distraction factors on performance in laparoscopic Surgery in immersive virtual reality – a study protocol of a cross-over trial in medical students and residents - DisLapVR. JMIR Research Protocols, 59014. Link

2024 Chaudhari, A., Lokesh, R., **Chheang, V.**, Doshi, S.M., Barmaki, R.L., Cashaback, J.G., Thostenson, E.T., 2024. Characterizing the Sensing Response of Carbon Nanocomposite-Based Wearable Sensors on Elbow Joint Using an End Point Robot and Virtual Reality. Sensors, 24 (15): 4894.Link

2024 Hanke, L.I., Vradelis, L., Boedecker. C, Griesinger. J, Demare, T., Lindemann, N. R., Huettl, F., **Chheang, V.**, Saalfeld, P., Wachter, N., Wollstadter, J., Spranz, M., Lang, H., Hansen, C., and Huber, T., 2024. Immersive virtual reality for interdisciplinary trauma management – initial evaluation of a training tool prototype. BMC Medical Education, 24, 769. Link

2022 Allgaier, M.*, **Chheang, V.***, Saalfeld, P., Apilla, V., Huber, T., Huettl, F., Neyazi, B., Sandalcioglu, I.E., Hansen, C., Preim, B. and Saalfeld, S., 2022. A comparison of input devices for precise interaction tasks in VR-based surgical planning and training. Computers in Biology and Medicine, 145, p.105429. *_**Allgaier, M. and Chheang, V. – joint first authorship**_. Link

2021 **Chheang, V.**, Saalfeld, P., Joeres, F., Boedecker, C., Huber, T., Huettl, F., Lang, H., Preim, B. and Hansen, C., 2021. A collaborative virtual reality environment for liver surgery planning. Computers & Graphics, 99, pp.234-246. Link

2020 **Chheang, V.**, Fischer, V., Buggenhagen, H., Huber, T., Huettl, F., Kneist, W., Preim, B., Saalfeld, P. and Hansen, C., 2020. Toward interprofessional team training for surgeons and anesthesiologists using virtual reality. International journal of computer assisted radiology and surgery, 15, pp.2109-2118. Link

2020 **Chheang, V.**, Jeong, S., Lee, G., Ha, J.S. and Yoo, K.H., 2020. Natural embedding of live actors and entities into 360 virtual reality scenes. The Journal of Supercomputing, 76(7), pp.5655-5677. Link

2017 **Chheang, V.**, Ryu, G., Jeong, S., Lee, G. and Yoo, K.H., 2017. Virtual Reality Using X3DOM. _Journal of the Institute of Electronics and Information Engineers_, 54(1): 165-170. Link

CONFERENCE PROCEEDINGS

2025 Giovannelli, A., Pavanatto, L., Davari, S., Miao, H., **Chheang, V.**, Giera, B., Bremer, P.T., and Bowman, D. 2025. Investigating the Influence of Playback Interactivity during Guided Tours for Asynchronous Collaboration in Virtual Reality. In IEEE Conference on Virtual Reality and 3D User Interfaces (VR). Link

2024 **Chheang, V.**, Weston, B.T., Cerda, R.W., Au, B., Giera, B., Bremer, P.T. and Miao, H., 2024. A Virtual Environment for Collaborative Inspection in Additive Manufacturing. Extended Abstracts of the CHI Conference on Human Factors in Computing Systems (pp. 1–7). Link

2024 🏆 **Chheang, V.**, Sharmin, S., Márquez-Hernández, R., Patel, M., Rajasekaran, D., Caulfield, G., Kiafar, B., Li, J., Kullu, P. and Barmaki, R.L., 2024. Towards anatomy education with generative AI-based virtual assistants in immersive virtual reality environments. In IEEE International Conference on Artificial Intelligence and eXtended and Virtual Reality (AIxVR) (pp. 21-30). IEEE. Link Best Paper Honorable Mention Award

2024 Li, J., **Chheang, V.**, Kullu, P., Brignac, E., Guo, Z., Bhat, A., Barner, K.E. and Barmaki, R.L., 2023. MMASD: A multimodal dataset for autism intervention analysis. In Proceedings of International Conference on Multimodal Interaction (pp. 397-405). Link

2023 🏆 Baron, L.*, **Chheang, V.***, Chaudhari, A., Liaqat, A., Chandrasekaran, A., Wang, Y., Cashaback, J., Thostenson, E. and Barmaki, R.L., 2023. Virtual therapy exergame for upper extremity rehabilitation using smart wearable sensors. In Proceedings of the ACM/IEEE International Conference on Connected Health: Applications, Systems and Engineering Technologies (pp. 92-101). *_**Baron, L. and Chheang, V. – joint first authorship**_. Link Best Paper Award

2023 Guo, Z., **Chheang, V.**, Li, J., Barner, K.E., Bhat, A. and Barmaki, R.L., 2023. Social visual behavior analytics for autism therapy of children based on automated mutual gaze detection. In Proceedings of the ACM/IEEE International Conference on Connected Health: Applications, Systems and Engineering Technologies (pp. 11-21). Link

2023 **Chheang, V.**, Bruggernann, R., Preim, B. and Hansen, C., 2023. Virtual Resection Planning using Bezier Surface Interactions in Collaborative VR Environments. In IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops (VRW) (pp. 166-169). IEEE. Link

2022 **Chheang, V.**, Heinrich, F., Joeres, F., Saalfeld, P., Barmaki, R., Preim, B. and Hansen, C., 2022. WiM-Based Group Navigation for Collaborative Virtual Reality. In 2022 IEEE International Conference on Artificial Intelligence and Virtual Reality (AIVR) (pp. 82-92). IEEE. Link

2022 **Chheang, V.**, Schott, D., Saalfeld, P., Vradelis, L., Huber, T., Huettl, F., Lang, H., Preim, B. and Hansen, C., 2022. Towards virtual teaching hospitals for advanced surgical training. In IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops (VRW) (pp. 410-414). IEEE. Link

2019 **Chheang, V.**, Saalfeld, P., Huber, T., Huettl, F., Kneist, W., Preim, B. and Hansen, C., 2019. Collaborative virtual reality for laparoscopic liver surgery training. In IEEE international conference on artificial intelligence and virtual reality (AIVR) (pp. 1-17). IEEE. Link

OTHER PUBLICATIONS (POSTERS, DEMOS, AND ABSTRACTS)

2023 Baron, L.*, **Chheang, V.***, Chaudhari, A., Liaqat, A., Chandrasekaran, A., Wang, Y., Cashaback, J., Thostenson, E. and Barmaki, R.L., 2023. Poster: Virtual Reality Exergame for Upper Extremity Rehabilitation Using Smart Wearable Sensors. In Proceedings of the ACM/IEEE International Conference on Connected Health: Applications, Systems and Engineering Technologies (pp. 183-184). ***Baron, L. and Chheang, V. – joint first authorship**.

2023 Hanke, L.I., Schulte, R., **Chheang, V.**, Saalfeld, P., Wessels, M., von Castell, C., Huettl, F., Hecht, H., Lang, H., Hansen, C. and Huber, T., 2023. Einfluss von Störungen im Laparoskopietraining in hoch immersiver virtueller Realität [Influence of disturbances in laparoscopy training in highly immersive virtual reality]. Zeitschrift für Gastroenterologie, 61(08), p.KV457.

2022 Hanke, L.I., Boedecker, C., Griesinger, J., Demare, T., Lindemann, N.R., Vradelis, L., Hüttl, F., **Chheang, V.**, Saalfeld, P., Wollstädter, J. and Hess, M., 2022. Weiterbildung in immersiver virtueller Realität–Evaluation eines Prototyps zur interdisziplinären Versorgung kritisch kranker Patienten im Schockraum [Training in immersive virtual reality - evaluation of a prototype for the interdisciplinary care of critically ill patients in the emergency room]. Zeitschrift für Gastroenterologie, 60(08), p.KA522.

2022 **Chheang, V.**, Heinrich, F., Joeres, F., Saalfeld, P., Preim, B. and Hansen, C., 2022. Group WiM: A group navigation technique for collaborative virtual reality environments. In IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops (VRW) (pp. 556-557). IEEE.

2022 Allgaier, M.*, **Chheang, V.***, Saalfeld, P., Apilla, V., Huber, T., Huettl, F., Neyazi, B., Sandalcioglu, I.E., Hansen, C., Preim, B. and Saalfeld, S., 2022. A Comparison of Input Devices for Precise Interaction Tasks in VR-based Surgical Planning and Training. In IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops (VRW) (pp. 674-675). IEEE. ***Allgaier, M. and Chheang, V. – joint first authorship**.

2021 **Chheang, V.**, Apilla, V., Saalfeld, P., Boedecker, C., Huber, T., Huettl, F., Lang, H., Preim, B. and Hansen, C., 2021. Collaborative VR for liver surgery planning using wearable data gloves: An interactive demonstration. In IEEE conference on virtual reality and 3D user interfaces abstracts and workshops (VRW) (pp. 768-768). IEEE.

2019 **Chheang, V.**, Saalfeld, P., Huber, T., Huettl, F., Kneist, W., Preim, B. and Hansen, C., 2019. An interactive demonstration of collaborative VR for laparoscopic liver surgery training. In IEEE International Conference on Artificial Intelligence and Virtual Reality (AIVR) (pp. 247-2471). IEEE.

2019 **Chheang, V.**, Saalfeld, P., Huber, T., Huettl, F., Kneist, W., Preim, B. and Hansen, C., 2019. Towards Multi-user Virtual Reality Camera Navigation Training for Laparoscopic Surgery. In IEEE Engineering in Medicine and Biology Society (EMBS) International Student Conference (p. 14).

2019 Huber, T., Huettl, F., Saalfeld, P., **Chheang, V.**, Paschold, M., Lang, H., Preim, B., Kneist, W. and Hansen, C., 2019. Entwicklung eines interaktiven multi-user virtual reality moduls Am beispiel der leberresektion [Development of an interactive multi-user virtual reality module using the example of liver resection]. Zeitschrift für Gastroenterologie, 57(09), pp.KV-278.

2018 **Chheang, V.**, Yoo, K.H., 2018. Interactive Pseudo-Holographic Rendering for 3D Scanned Model. In: *International Conference on Big Data Applications and Services*, Vol 6, pp. 373–376.

2018 **Chheang, V.**, Jeong, S., Lee, G., Nasridinov, A. and Yoo, K.H, 2018. 3D Model Reconstruction using Conditional Euclidean Clustering. In: *International Conference on Big Data Applications and Services*, Vol 6, pp. 186–191.

2017 **Chheang, V.**, Jeong, S., Lee, G. and Yoo, K.H., 2017. Cylindrical embedding a live actor and entity into 360° virtual reality scene. In: *International Conference on Big Data Applications and Services*, Vol. 5, pp. 43–45.

2017 **Chheang, V.**, Chhaya, P.P., Leang, B., Ryu, G., Jeong, S., Lee, G. and Yoo, K.H., 2017. Navigation Control in Virtual Reality Walking Tour. In: *International Conference on Big Data Applications and Services*, Vol. 4, pp. 210–212.

2017 **Chheang, V.**, Manith, E., Jeong, S., Lee, G., Ryu, G., Yoo, K.H., 2017. Authoring Tool for Virtual Reality Scene. In: *Korean Computer Graphics Society Conference*, pp. 127–128.

2017 Doung, C., Leang, B., Eath, M., **Chheang, V.**, Ryu, G.A. and Yoo, K.H., 2017. Manufacturing Data Analysis Method Using Curve Deviation. In Proceedings of the 2017 KCGS Conference of the Korean Society of Computer Graphics, pp.91-92.

2016 **Chheang, V.**, Ryu, G., Jeong, S., Lee, G. and Yoo, K.H., 2016. A Web-based System for Embedding a Live Actor and Entity using X3DOM. In: *Korea Broadcasting and Media Engineering Conference*, pp. 1–3.

2016 **Chheang, V.**, Ryu, G., Jeong, S., Lee, G. and Yoo, K.H., 2016. X3D Virtual Reality. In: *Proceedings of Global 3D Tech Forum*, Vol. 5, pp. 27–29.

THESES

2022 **Chheang, V.**. Collaborative Virtual Reality for Laparoscopic Liver Surgery Training and Planning. *PhD Thesis*, Otto-von-Guericke University Magdeburg, Germany, 2022. Link

2018 **Chheang, V.**. Design and Implementation of Live Actor and Entity Representation System in 360° Virtual Reality Scene. *Master's Thesis*, Chungbuk National University, South Korea, 2018. Link

INTERNATIONAL STANDARD

2019 ISO/IEC 18040:2019 – Information technology – Computer graphics, image processing and environmental data representation – Live actor and entity representation in mixed and augmented reality (MAR).

PREPRINTS

2023 **Chheang, V.**, Lokesh, R., Chaudhari, A., Wang, Q., Baron, L., Doshi, S., Thostenson, E., Cashaback, J. and Barmaki, R.L.. Immersive Virtual Reality and Robotics for Upper Extremity Rehabilitation. arXiv preprint arXiv:2304.11110. Link

RESEARCH PROPOSALS

XR and LLM-Enhanced Innovations for Metal Additive Manufacturing
PI: Heiden, M. and **Chheang, V.**, DOE FY 2025 Interlaboratory LDRD/SDRD, Sandia National Laboratories (SNL) and Lawrence Livermore National Laboratory (LLNL). [Rejected]

Enhancing Agility in Cross-Site Collaboration and AM Data Inspection with Immersive Technologies
Inter Laboratories: SNL, LLNL (Bremer, T., Miao, H., **Chheang, V.**, Guss, G.), SRNL, KCNSC, Pantex, and Y12, DOE ACT, 2024. [Rejected]

VR-MED – Virtual Reality-based emergency simulation for medical education and training   Link
PI: Hansen, C. Co-I: Schwenderling, L., Polenz L., **Chheang, V.**, Wunderling T.. Funding agency: Federal Ministry of Educaton and Research (BMBF), Germany. Awarded: 2021–2023.

AVATAR – Development of Augmented and Virtual Multi-User Applications for Medical-Technical Exchange in Immersive Rooms   Link
PI: Hansen, C. Co-I: Saalfeld, P., **Chheang, V.**, Mewes, A., Wagner, S.. Funding agency: Federal Ministry of Educaton and Research (BMBF), Germany. Funding amount: €844,613, Awarded: 2018–2022.

PROFESSIONAL SERVICES – JOURNAL & CONFERENCE REVIEWING

JOURNAL REVIEWER

	NUMBER OF REVIEWS
• IEEE Transactions on Visualization and Computer Graphics	3
• International Journal of Human-Computer Interaction, Taylor & Francis	4
• Computers & Graphics, Elsevier	4
• IEEE Consumer Electronics Magazine	4
• BMC Medical Education, Springer	2
• International Journal of Computer Assisted Radiology and Surgery, Springer	2
• Artificial Intelligence Review, Springer	2
• Computer Methods in Biomechanics and Biomedical Engineering: Imaging & Visualization, Taylor & Francis	1
• Computer Methods and Programs in Biomedicine, Elsevier	1
• Computers in Biology and Medicine, Elsevier	1
• Displays, Elsevier	3
• IEEE Computer Graphics and Applications	1
• Journal of Medical Systems, Springer	1
• Virtual Reality, Springer	2
• The Visual Computer, Springer	1
• Scientific Reports, Springer	1

- Computer Methods and Programs in Biomedicine Update, Elsevier   1

CONFERENCE REVIEWER   NUMBER OF REVIEWS

- IEEE International Symposium on Mixed and Augmented Reality (ISMAR)   6 (2023 – 2024)

- ACM Conference on Human Factors in Computing Systems (CHI)   1 (2023)

- International Conference on Information Processing in Computer-Assisted Interventions   1 (2023)

- ACM SIGCHI Interaction Design and Children (IDC)   1 (2023)

- Eurographics Workshop on Visual Computing for Biology and Medicine   1 (2022)

PROFESSIONAL AFFILIATIONS & MEMBERSHIP

Sigma Xi, The Scientific Research Honor Society – Full Membership	**2024 – Present**
IEEE Membership	**2022 – Present**
IEEE Computer Society	**2022 – Present**
IEEE Young Professionals	**2023 – Present**
Association for Computing Machinery (ACM) Membership	**2023 – Present**
National Postdoctoral Association	**2022 – Present**
Korea Big Data Services Society (BIGDAS)	**2016 – 2018**

FURTHER TRAINING

05/2021	**Bio+Med+Vis Spring School**	EG VCBM, BioVis, and the Mohn Medical Imaging and Visualization Center
09/2019	**Scientific Writing**	Graduate Academy, Otto-von-Guericke University Magdeburg, Magdeburg, Germany
10/2014 – 01/2015	**Advanced Course of Software Development Training**	Korea Software HRD Center, Phnom Penh, Cambodia
04/2014 – 08/2014	**Basic Course of Software Development Training**	Korea Software HRD Center, Phnom Penh, Cambodia

TECHNICAL SKILLS

- **Experience areas**: Research and Development, Virtual and Augmented Reality, Human-Computer Interaction, Visualization, User Studies.

- **Programming Languages**: C#, Java, Python, C++, R, Visual Basic, HTML, CSS, JavaScript, PHP.

- **Tools & Technologies**: Unity Engine, Photon Unity Networking, Unet, VRTK, MRTK, Git, Latex, SimpleITK, Geometry3Sharp, MevisLab, Blender, ParaView, R Studio, X3DOM, Three.js, Aframe, WebVR, Anacoda, Jupyter Notebook, Lab Streaming Layer, OpenAI API, Tobii Eye Tracking API.

- **Platforms & Devices**: SteamVR-support devices, Oculus (Meta Quest), Microsoft HoloLens, Microsoft Kinect, NReal, LeapMotion, Manus Wearable Data Gloves, Arduino.

PRESENTATIONS

INVITED TALKS & DEMOS

- "Leveraging Virtual Reality for Planning, Training, and Team Collaboration", Chungbuk National University, January 09, 2025.

- "A Collaborative Virtual Reality Environment for Liver Surgery Planning", EG Workshop on Visual Computing for Biology and Medicine (VCBM), September 24, 2021.

- "An Interactive Demonstration of Collaborative VR for Laparoscopic Liver Surgery Training", International Conference on Artificial Intelligence and Virtual Reality (IEEE AIVR), December 11, 2019.

CONFERENCE PRESENTATIONS

- "Virtual Resection Planning using Bezier Surface Interactions in Collaborative VR Environments", XR for Healthcare and Wellbeing, IEEE VR, March 25, 2023 (Remote).

- "WiM-Based Group Navigation for Collaborative Virtual Reality", IEEE AIVR, December 12 – 14, 2022 (Remote).

- "Group WiM: A group navigation technique for collaborative virtual reality environments", IEEE VR, March 12 – 16, 2022 (Remote).

- "Towards virtual teaching hospitals for advanced surgical training", XR for Healthcare and Wellbeing, IEEE VR, March 13, 2022 (Remote).

- "Collaborative VR for Liver Surgery Planning using Wearable Data Gloves: An Interactive Demonstration", IEEE VR, March 27 – April 02, 2021 (Remote).

- "Collaborative Virtual Reality for Laparoscopic Liver Surgery Training", IEEE AIVR, San Diego, CA, USA, December 09 – 11, 2019.

- "Towards Multi-user Virtual Reality Camera Navigation Training for Laparoscopic Surgery", IEEE EMB ISC, Magdeburg, Germany, November 22 – 24, 2019.

- "Interactive Pseudo-Holographic Rendering for 3D Scanned Model" and "3D Model Reconstruction using Conditional Euclidean Clustering", Korea Big Data Services Society (BIGDAS), Zhengzhou, Henan, China, August 19 – 22, 2018.

- "Cylindrical embedding a live actor and entity into 360 virtual reality scene", Korea Big Data Services Society (BIGDAS), Jeju, South Korea, November 23 – 25, 2017.

- "Authoring Tool for Virtual Reality Scene", Korean Computer Graphics Society Conference, Jeju, South Korea, July 11 – 14, 2017.

- "Navigation Control in Virtual Reality Walking Tour", Korea Big Data Services Society (BIGDAS), Tashkent, Uzbekistan, July 11 – 14, 2017.

- "A Web-based System for Embedding a Live Actor and Entity using X3DOM", Korea Broadcasting and Media Engineering Conference, Seoul, South Korea, November 04, 2016.

DOCTORAL SYMPOSIUM

- **Chheang, V.**, Collaborative Virtual Reality for Laparoscopic Liver Surgery Training and Planning. *FIN Doctoral Symposium*, University of Magdeburg, Magdeburg, Germany, July 13, 2021.

SELECTED PRESS

- LLNL Data Science Institute (DSI) Newsletter, "Enabling AM Part Inspection of Digital Twins', Vol. 43, 01/2025. Link

- Bandari, A., "Simulating liver surgeries with virtual reality', LLNL Computing, 10/2024. Link

- "DOE, LLNL take center stage at inaugural artificial-intelligence expo", LLNL, 06/2024. Link

- "Successful doctoral defence of Vuthea Chheang", Forschungscampus STIMULATE, 09/2021. Link

- "Interview "Wir sind STIMULATE" mit Vuthea Chheang", Forschungscampus STIMULATE, 10/2021. Link

- "New cooperation with Chungbuk National University, South Korea", 02/2019. Link

- "An academic student in Korea wants to bring Cambodia into technological development (Translated from Khmer)", 12/2015. Link

WEBINAR & PODCAST

- "Success Against the Odds Podcast Interview with Dr. Vuthea Chheang", Podcast, Sophaline Mao, 02/2024. Link

- "Collaborative Virtual Reality for Laparoscopic Liver Surgery Training and Planning, Webinar, Korea Alumni Association of Cambodia, 04/2023. Link

LANGUAGES

Khmer - Native Language, **English** - Professional Proficiency, **German** - Basic, **Korean** - Basic