Empowering Novel Geometric Algebra for Graphics & Engineering Workshop @ CGI 2025 – 14th July 2025

1st Call for Papers

http://www.cgs-network.org/cgi25, https://twitter.com/ENGAGEworkshop, https://engage-workshop.org/

The ACM Siggraph 2001, 2003, 2019 and 2022 saw Geometric Algebra (GA) featured in the form of a Keynote and Courses. The GA community continues to highlight the benefits of employing W. K. Clifford's GA, quaternions and octonions for computer graphics and vision problems. The advances were presented at the Workshops CGI'2016 on "Geometric Algebra in Computer Science and Engineering" and annually at CGI'2017-2024 on "**E**mpowering **N**ovel **G**eometric **A**lgebra for **G**raphics & **E**ngineering (ENGAGE)" and have underlined the power of GA for analysis and computation. GAME2020, 2023, further boost GA and associated algebras as a language for Graphics.

Under the auspices of **CGI'25** (14-18 July 2025), ENGAGE2025 on **July 14th** in Hongkong, with keynotes by *Carlile Lavor* (Campinas, Brazil), *Hongbo Li* (Beijing, China), *Francisco Montoya* (Almeria, Spain), will again provide a multi-disciplinary approach from mathematics applied to computer graphics, computer vision and general computer science fields, where GA has strong potential to answer existing mathematical problems.

GA is particularly well suited to allow cross-disciplinary solutions in software engineering as it provides an intuitive and insightful common denominator across mathematical disciplines used in a variety of applications. Understanding GA enables us to relate distinct, seemingly incompatible paths by providing a common geometric and mathematical base.

We invite original contributors in the form of papers, which advance the state-of-the-art in both the application of GA and its instantiation in software and hardware. **Topics will include, but are not limited to**:

- Feature detection & Data analysis
- LIDAR and point cloud algorithms
- Sci. & Information visualization
- Computer graphics rendering
- Computer animation and video processing
- Holographic optics & Holographic maps
- Geographic information systems GIS & Climate
- Soundscape & Electromagnetic landscape modelling
- AR, VR, XR
- Clifford integral transforms for 2/3D images/color images
- Higher dimensional geometric algebras, octonions
- GA, HPC and quantum computing
- GA hardware implementations
- GA for AI & deep learning, multi-modal data mining/data fusion
- GA for ubiquitous information processing
- GA for big data & visualization
- Other engineering / science applications using GA

Authors should submit *papers* directly to the CGI LNCS proceedings (CGI 2025 ENGAGE LNCS track), by May 2, 2025. All authors of accepted ENGAGE related papers will be invited either to an oral or poster presentation. For Springer LNCS CGI proceedings author instructions please refer to http://www.cgs-network.org/cgi25/#callforpapers.

TBC: Post workshop *extended* and more *advanced* ENGAGE *papers* (**with** at least 30% new data, algorithms, proofs, figures, etc.) can be published in a topical collection of the SpringerNature journal Adv. in Appl. Cliff. Algs. (AACA), and should have been orally presented at the conference.

Awards for *best paper* and *best application*, see: engage-workshop.org

IMPORTANT DATES

Abstract submission (~200 words): April 31, 2025 to hitzer@icu.ac.jp, dietmar.hildenbrand@gmail.com

ENGAGE Papers: (to appear in Springer LNCS, 8-12 pages)

- Paper submission: May 2, 2025
- Paper notification: June 5, 2025
- Camera ready papers: June 20, 2025

TBC: Full Journal AACA Papers (Latex using birkjour.cls) submission: *Aug. 01-Dec. 31, 2025*

For **further information**, please contact the organizers:

- Kamron Abdulkhaev (Moscow)
- Andreas Aristidou (Cyprus)
- Werner Benger (Innsbruck)
- Stephane Breuils (Savoie Mont-Blanc)
- Hugo Hadfield (Nvidia Seattle Robotics)
- Dietmar Hildenbrand (Darmstadt)
- Eckhard Hitzer♯ (Tokyo) (hitzer@icu.ac.jp)
- Xiao-Xiao Hu (Wenzhou)
- Manos Kamarianakis (Crete)
- Adam Leon Kleppe (Alesund)
- Joan Lasenby (Cambridge)
- Kit Ian Kou (Macao)
- Vincent Nozick (Paris)
- Yu Zhaoyuan (Nanjing)
- Lars Tingelstad (Trondheim)
- George Papagiannakis# (Crete)
- Dmitry Shirokov (Moscow)
- Kanta Tachibana (Tokyo)
- Petr Vasik (Brno)

(♯ = local workshop organizers)

Sponsors: Ogre.run (TBC) ORamaVR.com, GA Computing Research and Application Center, Taylor & Francis, Birkhaeuser/SpringerNature