Dr. Yulia Gryaditskaya

Assistant professor, CVSSP and Surrey Institute for People-Centred AI, UK
Director of the Computational Creativity and Modeling Lab (CCM) and co-director of the SketchX group

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Research Skills

AI, Generative models (GANs, Diffusion models, and Normalizing flows), 3D graphics / 3D vision, Transformers, Fine-tuning large pretrained models (e.g. CLIP), Image and Video Processing

Applied Research Areas

Sketch understanding, 3D shape generation, CAD, Architecture, and Computational creativity.

Programming Languages

Python/PyTorch, C/C++, MatLab

Employment

02/2022–present **CVSSP and Surrey Institute for People-Centred AI**, *Surrey, UK*, Lecturer in AI.

- R Research in Generative AI, 3D shape generation and retrieval, fine-tuning foundation models, open vocabulary segmentation and sketch understanding
- P Published at ICCV, CVPR, ECCV, SIGGRAPH, 3DV, IEEE TIP and Computers & Graphics
- D Gathered and released datasets: scene sketch-image pairs.
- M Advising 3 Ph.D., 6 master, and 1 undergrad students
- T Developed and taught: "VR/AR and Metaverse" and "Computer Vision and Graphics"

02/2020–01/2022 **CVSSP**, *Surrey, UK*, Senior research fellow,
Line manager: Prof. Yi-Zhe Song.

- R Research in 3D shape generation and retrieval, fine-tuning foundation models, sketch understanding and generation
- P Published at SIGGRAPH, SIGGRAPH Asia, 3DV, IEEE TCSVT, and IEEE TIP
- D Gathered and released datasets: (i) 2D sketch and 3D shape pairs, (ii) 3D VR sketch and 3D shape pairs, (iii) multi-category sketches.
- M Co-advised 4 Ph.D. and 3 master students
- I Implemented research ideas in Python, C++, Pytorch, MatLab.

02/2017– 01/2020 **Inria**, *Sophia Antipolis, France*, Postdoctoral researcher, Advisor: Dr. Adrien Bousseau (Research Director - Inria).

- R Research in concept sketch understanding: 3D generation and segmentation, and NPR rendering
- P Published at SIGGRAPH Asia 2019, 2020 as first author
- D Gathered and released a richly annotated dataset of industrial design sketches: OpenSketch
- M Co-advised 3 master students
- I Implemented research ideas and data collection interfaces using MatLab, C/C++, OpenGL/WebGL, Qt, Javascript/Node.js, SQL, libigl, Python, TensorFlow

04/2014 – 09/2014 **Technicolor R & D**, *Rennes, France*, Research Internship, Advisor: Dr. Erik Reinhard (Distinguished Scientist - InterDigital, Inc.).

- R Research on HDR video capture on a mobile device.
- P Published at Computer Graphics Forum and international-level patent
- I Implemented research ideas in C/C++, MatLab, Java

11/2012 – 12/2016 **Max Planck Institute for Informatics**, *Saarbrücken, Germany*, Ph.D candidate, Supervisors: Dr. Erik Reinhard, Prof. Dr-in.z. Karol Myszkowski, Prof. Dr. Hans Peter-Seidel.

- R Research on HDR video capture on a mobile device, HDR imaging, and materials editing in structured light fields.
- P Published at CGF (EGSR and Pacific Graphics) 2014, 2015 and VMV 2016
- D Gathered and released a dataset of calibrated HDR images
- I Implemented research ideas in C/C++, MatLab, Java

Education

11/2012 – 12/2016 **Ph.D. in Computer Graphics and Vision**, *Max Planck Institute for Informatics, Saarland University, Saarbrücken, Germany*, *Magna cum laude – Date of the Ph.D. defense: 2 June 2017.*
Dissertation title: 'High Dynamic Range Imaging: Problems of Video Exposure Bracketing, Luminance Calibration and Gloss Editing'

09/2007 – 06/2012 **Diploma in Applied Mathematics and Computer Science**, *Faculty of Computational Mathematics and Cybernetics, Lomonosov Moscow State University, Russia*, Awarded a scholarship, *Excellent.*
Thesis title: 'Truncated sequential quadratic programming method for degenerate optimization problems' Advised by Prof. Dr. Alexey F. Izmailov

Additional education

2000 – 2004 **Art school**, *Zhukovsky, Moscow region*, Russia.

Publications

2023 **3D VR Sketch Guided 3D Shape Prototyping and Exploration**, *ICCV*,
L. Luo, P.N. Chowdhury, T. Xiang, YZ. Song and **Y. Gryaditskaya**.

2023 **Fine-Tuned but Zero-Shot 3D Shape Sketch View Similarity and Retrieval**,
ICCV SHARP Workshop (ICCVW),
G. Berardi and **Y. Gryaditskaya**.

2023 **SketchXAI: A First Look at Explainability for Human Sketches**,
The IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR),
Z. Qu, **Y. Gryaditskaya**, K. Li, K. Pang, T. Xiang, YZ. Song.
(Code available)

2022 **Symmetry-driven 3D Reconstruction from Concept Sketches**,
ACM SIGGRAPH North America'22,
F. Hahnlein, **Y. Gryaditskaya**, A. Sheffer and A. Bousseau.
(Code available)

2022 **FS-COCO: Towards Understanding of Freehand Sketches of Common Objects in Context**,
ECCV,
P.N. Chowdhury, A. Sain, A.K. Bhunia, T. Xiang, **Y. Gryaditskaya** and YZ. Song.
(Code available)

2022 **Garment Ideation: Iterative View-Aware Sketch-Based Garment Modeling**,
International Conference on 3D Vision (3DV) (oral),
P.N. Chowdhury, T. Wang, D. Ceylan, YZ. Song and **Y. Gryaditskaya**.
(Code available)

2022 **Structure-Aware 3D VR Sketch to 3D Shape Retrieval**,
International Conference on 3D Vision (3DV) ,
L. Luo, **Y. Gryaditskaya**, T. Xiang, YZ. Song.

2022 **A Study of Deep Single Sketch-Based Modeling: View/Style Invariance, Sparsity and Latent Space Disentanglement**,
Computers & Graphics,
Y. Zhong, **Y. Gryaditskaya**, H. Zhang, YZ. Song.
(Code available)

2022 **One Sketch for All: One-Shot Personalized Sketch Segmentation**,
IEEE Transactions on Image Processing,
A. Qi, **Y. Gryaditskaya**, T. Xiang, and YZ. Song.
(Code on demand)

2021 **Towards Fine-Grained Sketch-Based 3D Shape Retrieval**,
IEEE Transactions on Image Processing,
A. Qi, **Y. Gryaditskaya**, J. Song, Y. Yang, Y. Qi, T.M. Hospedales, T. Xiang, and YZ. Song.
(Code on demand)

2021 **Fine-grained VR sketching and Retrieval: Dataset and insights**,
Proc. of 3DV,
L. Luo, **Y. Gryaditskaya**, Y. Yang, T. Xiang, YZ. Song.
(Code available)

2020 **Towards Practical Sketch-based 3D Shape Generation: The Role of Professional Sketches**,
IEEE TCSVT.
Y. Zhong, Y, Qi, **Y. Gryaditskaya**, H. Zhang, YZ. Song

2020 **Pixelor: A Competitive Sketching AI Agent. So you think you can sketch?**,
ACM Trans. on Graph. (Proc. of SIGGRAPH Asia),
AK. Bhunia, A. Das, UR. Muhammad, Y. Yang, T. Hospedales, T. Xiang, **Y. Gryaditskaya**, Yi-Zhe Song.
(Code available)

2020 **Lifting Freehand Concept Sketches into 3D**,
ACM Trans. on Graph. (Proc. of SIGGRAPH Asia),
Y. Gryaditskaya, F. Hahnlein, C. Liu, A. Sheffer and A. Bousseau.
(Code available)

2020 **Towards 3D VR-Sketch to 3D Shape Retrieval**,
Proc. of 3DV, (Oral),
L. Luo, **Y. Gryaditskaya**, Y. Yang, T. Xiang, YZ. Song.
(Code available)

2020 **Deep Sketch-Based Modeling: Tips and Tricks**,
Proc. of 3DV, (Spotlight),
Y. Zhong, **Y. Gryaditskaya**, H. Zhang, YZ. Song .
(Code available)

2019 **OpenSketch: A Richly-Annotated Dataset of Product Design Sketches**,
ACM Trans. on Graph. (Proc. of SIGGRAPH Asia),
Y. Gryaditskaya, M. Sypesteyn, J.W. Howtijzer, S. Pont, F. Durand and A. Bousseau..
(Code available)

2019 **Bitmap or Vector? A study on sketch representations for deep stroke segmentation**,
Journées Françaises d'Informatique Graphique et de Réalité Virtuelle.
F. Hahnlein, **Y. Gryaditskaya** and A. Bousseau

2016 **Gloss Editing in Light Fields**,
VMV.
Y. Gryaditskaya, B. Masia, P. Didyk, K. Myszkowski, and H.-P. Seidel.

2015 **Motion Aware Exposure Bracketing for HDR video**,
Computer Graphics Forum (Proc. EGSR).
Y. Gryaditskaya, T. Pouli, E. Reinhard, K. Myszkowski, and H.-P. Seidel.

2014 **Sky Based Light Metering for HDR Images**,
Computer Graphics Forum (Proc. Pacific Graphics).
Y. Gryaditskaya, T. Pouli, E. Reinhard, and H.-P. Seidel

Patents

2017 **Method for generating an HDR image of a scene based on a tradeoff between brightness distribution and motion.**,
US Patent 9,648,251.
T. Pouli, **Y. Gryaditskaya**, E. Reinhard

Thesis

2017 **High dynamic range imaging: problems of video exposure bracketing, luminance calibration and gloss editing**.
Y. Gryaditskaya

Released datasets

2022 **FS-COCO: Scene sketches**, *Our dataset comprises 10, 000 freehand scene vector sketches with per point space-time information by 100 non-expert individuals, offering both object-and scene-level abstraction. Each sketch is augmented with its text description..*

2022 **3D VR chair sketches**, *We present the first fine-grained dataset of 1,497 3D VR sketch and 3D shape pairs for 1,005 chair shapes with large shapes diversity from the ShapeNetCore dataset from 50 participants..*

2020 **SlowSketch**, *1700 sketches from 12 participants of 20 categories, where the participants were asked to target early sketch recognition.*

2020 **ProSketch-3DChair**, *A dataset of 1500 chair sketches by professional artists: front, side and 3/4 viewpoints.*

2020 **3D VR sketches**, *139 chair and 28 bathtub 3D VR sketches by novices.*

2020 **OpenSketch++**, *Additional vector concept sketches.*

2019 **OpenSketch**, *A richly-annotated dataset of product design sketches.*

2014 **Calibrated HDR Images**, *A calibrated set of HDR images, with visible sky regions and color checker.*

Service/Professional Activities

Area Chair/Program Committee

2023 SIGGRAPH North America

2022 SIGGRAPH Asia

2022 SIGGRAPH North America

2021 SIGGRAPH Asia

Organizer

2023 Solving CAD History and pArameters Recovery from Point clouds and 3D scans (SHARP), ICCV 2023

2022 CVMP: Short Papers and Demos Chair

2022 2nd Workshop on Sketching for Human Expressivity (SHE) ECCV 2022

2021 1st Workshop on Sketching for Human Expressivity (SHE) ICCV 2021

2021-2022 Weekly group meetings for more than 20 attendees

Reviewer

PC Member:

- Eurographics Symposium on Rendering (EGSR 2022)
- IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR 2022,2023)
- International Conference on 3D Vision (3DV 2021)
- IEEE International Conference on Computer Vision (ICCV 2021)
- Computational Visual Media Conference (CVM 2020)

Journals:

- ACM Transactions on Graphics (TOG 2016)
- IEEE Transactions on Visualization and Computer Graphics (TVCG 2020-2023)
- Computer Animation and Virtual Worlds (CAVW 2020,2021)
- IEEE Transactions on Circuits and Systems for Video Technology (TCSVT 2020)
- IEEE Transactions on Image Processing (TIP 2018,2019)
- IEEE Transactions on Multimedia (2022)
- Computers & Graphics (2016)
- Journal of Electronic Imaging (JEI 2015,2017,2018)
- Journal on Image and Video Processing (JVIP 2016)
- Multimedia Systems (2015)

Conferences:

- SIGGRAPH North America (2014-,//,-2021-2023)
- SIGGRAPH Asia (2017,2023)
- Eurographics (2018,2019,2021-2023)
- Pacific Graphics (2020,2023)
- ICCVW (2023)
- VMV (2016)

Keynote talks

10/2022 ECCV 2022 workshop: "Drawings and abstract Imagery: Representations and Analysis" (DIRA).
Talk title: “Do you speak sketch?”

07/2022 CogSci 2022 workshop "From Images to Symbols: Drawing as a Window into the Mind".
Talk title: “Sketch understanding by a machine”

Invited talks

05/2023 The Science and Art of Seeing symposium, London. Talk title: “From 2D to 3D concept sketches by relying on sketching principles and visual cues”

05/2023 Interdisciplinary Centre for Security, Reliability and Trust, Luxembourg. Talk title: “Do you speak sketch?”

04/2023 Graphics and Imaging Lab - Universidad de Zaragoza, Spain. Talk title: “Do you speak sketch?”

03/2023 Research Seminar at the Durham University. Talk title: “Do you speak sketch?”

12/2022 Workshop at Inria, France.
Talk title: “Do you speak sketch?”

06/2022 Virtual Environments and Computer Graphics’ (VECG’s) seminar series, UCL, UK.
Talk title: “Amateur sketch understanding”

06/2021 Autodesk, UK

02/2021 University of Bath, UK

12/2020 Christmas Colloquium on Computer Vision, Skolkovo, Moscow, Russia

11/2020 UCL

11/2018 MIT CSAIL, Boston, USA

Mentoring

2022-2023 **Chenxi Liu**, *Rising Stars in Computer Graphics Mentor*.

Ph.D. current

2022-ongoing **Gizem Unlu**, *Collaborator*, (advisor Gabriel J. Brostow, UCL, UK), PhD student at UCL, UK.

2022-2025 **Ahmed Bourouis**, *Primary advisor*, (co-advised with Yi-Zhe Song and Judith Fan, Stanford University), PhD student at CVSSP.

2022-2025 **Alexander Ashcroft**, *Secondary advisor*, (co-advised with Yi-Zhe Song), PhD student at CVSSP.

Ph.D. Past

2022-2023 **Giuanluca Berardi**, *Internship advisor*, Visiting PhD student from the University of Bologna.
6 months research visit

2021-2022 **Pinaki Nath Chowdhury**, *leading advisor during the indicated period*, (co-advised with Yi-Zhe Song), PhD student at CVSSP.

2020-2023 **Ling Luo**, *leading advisor during the indicated period*, (co-advised with Yi-Zhe Song), PhD student at CVSSP.

2019-2022 **Felix Hähnlein**, *(co-advised with Adrien Bousseau)*, PhD student at Inria, France.
Has defended his Ph.D. thesis on 2nd December 2022

2020-2022 **Yue Zhong**, *leading advisor during the indicated period*, (co-advised with Yi-Zhe Song), PhD student at CVSSP.
Has defended her Ph.D. thesis on 27 September 2022

2020-2021 **Anran Qi**, *leading advisor during the indicated period*, (co-advised with Yi-Zhe Song), PhD student at CVSSP.
Has defended her Ph.D. thesis on 8th November 2021

Press

2021 Interview at ICCV Daily

Languages

English: fluent

French: intermediate

Russian: mother tongue