prof. Ing. Daniel Sýkora, Ph.D.

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BIOGRAPHY

Born
Prague, 29th August 1978.

Married
wife: Pavla (*1973),
daughters: Jolana (*2010), Štěpánka (*2005), step-sons: Matyáš (*1996), Mikuláš (*1993).

EDUCATION

Czech Technical University in Prague
Ph.D., Computer Science and Engineering, March 2007.
M.Sc., Computer Science and Engineering, March 2003.

ACADEMIC EXPERIENCE

Czech Technical University in Prague

Full Professor	**December 2018 – present**
Associate Professor	**December 2014 – November 2018**
Assistant Professor	**October 2010 – November 2014**
Research Fellow	**January 2006 – February 2008**

University of Utah

Visiting Fulbright Scholar	**August 2017 – February 2018**

Trinity College Dublin

Postdoctoral Research Fellow	**July 2008 – July 2010**

PROFESSIONAL EXPERIENCE

Walt Disney Animation Studios

Visiting Researcher	**July 2014 – September 2014**
Graduate Associate	**July 2010 – September 2010**

AniFilm, s.r.o.

Research & Development	**February 2008 – June 2008**

Digital Media Production, a.s.

Research & Development	**July 2001 – February 2008**

CONSULTING

Snap, Inc.	**March 2018 – December 2019**
Universal Production Partners, a.s.	**September 2012 – December 2019**
Disney Research Zurich	**October 2011 – October 2015**
Walt Disney Animation Studios	**October 2010 – November 2015**

AWARDS

Best in Show Award at Real-Time Live!, SIGGRAPH, August 2020.
Outstanding Applied Research Award, CTU in Prague, January 2020.
The Neuron Award for Promising Young Scientists, Neuron, May 2017.
Best Paper Award, NPAR, August 2011.
Best Poster Award, NPAR, June 2010.
Günter Enderle Best Paper Award, Eurographics, May 2010.
Outstanding Dissertation Award, CTU in Prague, September 2007.
ACM Student Award, Czech ACM & Microsoft, November 2003.

SIGGRAPH PAPERS

M. Dvorožňák, D. Sýkora, C. Curtis, B. Curless, O. Sorkine-Hornung, and D. Salesin **Monster Mash: A Single-View Approach to Casual 3D Modeling and Animation.** To appear in *ACM Transactions on Graphics* 39(6):214, 2020 (SIGGRAPH Asia, December 2020).

O. Texler, D. Futschik, M. Kučera, O. Jamriška, Š. Sochorová, M. Chai, S. Tulyakov, and D. Sýkora: **Interactive Video Stylization Using Few-Shot Patch-Based Training.** In *ACM Transactions on Graphics* 39(4):73, 2020 (SIGGRAPH, August 2020).

O. Jamriška, Š. Sochorová, O. Texler, M. Lukáč, J. Fišer, J. Lu, E. Shechtman, and D. Sýkora: **Stylizing Video by Example.** In *ACM Transactions on Graphics* 38(4):107, 2019 (SIGGRAPH, Los Angeles, USA, July 2019).

M. Dvorožňák, W. Li, V. Kim, and D. Sýkora: **ToonSynth: Example-Based Synthesis of Hand-Colored Cartoon Animations.** In *ACM Transactions on Graphics* 37(4):167, 2018 (SIGGRAPH, Vancouver, Canada, August 2018), **Patent pending**.

J. Fišer, O. Jamriška, D. Simons, E. Shechtman, J. Lu, P. Asente, M. Lukáč, and D. Sýkora: **Example-Based Synthesis of Stylized Facial Animations.** In *ACM Transactions on Graphics* 36(4):155, 2017 (SIGGRAPH, Los Angeles, USA, July 2017).

M. Dvorožňák, P. Bénard, P. Barla, O. Wang, and D. Sýkora: **Example-Based Expressive Animation of 2D Rigid Bodies.** In *ACM Transactions on Graphics* 36(4):127, 2017 (SIGGRAPH, Los Angeles, USA, July 2017).

M. Lukáč, D. Sýkora, K. Sunkavalli, E. Shechtman, O. Jamriška, N. Carr, and T. Pajdla: **Nautilus: Recovering Regional Symmetry Transformations for Image Editing.** In *ACM Transactions on Graphics* 36(4):108, 2017 (SIGGRAPH, Los Angeles, USA, July 2017).

J. Fišer, O. Jamriška, M. Lukáč, E. Shechtman, P. Asente, J. Lu, and D. Sýkora: **StyLit: Illumination-Guided Example-Based Stylization of 3D Renderings.** In *ACM Transactions on Graphics* 35(4):92, 2016 (SIGGRAPH, Anaheim, USA, July 2016).

O. Jamriška, J. Fišer, P. Asente, J. Lu, E. Shechtman, and D. Sýkora: **LazyFluids: Appearance Transfer for Fluid Animations.** In *ACM Transactions on Graphics* 34(4):92, 2015 (SIGGRAPH, Los Angeles, USA, August 2015).

J. Tan, M. Dvorožňák, D. Sýkora, and Y. Gingold: **Decomposing Time-Lapse Paintings into Layers.** In *ACM Transactions on Graphics* 34(4):61, 2015 (SIGGRAPH, Los Angeles, USA, August 2015).

D. Sýkora, L. Kavan, M. Čadík, O. Jamriška, A. Jacobson, B. Whited, M. Simmons, and O. Sorkine-Hornung: **Ink-and-Ray: Bas-Relief Meshes for Adding Global Illumination Effects to Hand-Drawn Characters.** In *ACM Transactions on Graphics* 33(2):16, 2014 (SIGGRAPH, Vancouver, Canada, August 2014).

M. Lukáč, J. Fišer, J.-C. Bazin, O. Jamriška, A. Sorkine-Hornung, and D. Sýkora: **Painting by Feature: Texture Boundaries for Example-Based Image Creation.** In *ACM Transactions on Graphics* 32(4):116, 2013 (SIGGRAPH, Anaheim, California, USA, July 2013).

JOURNAL PAPERS   F. Hauptfleisch, O. Texler, A. Texler, J. Křivánek, and D. Sýkora: **StyleProp: Real-time Example-based Stylization of 3D Models.** To appear in *Computer Graphics Forum* 39(7), 2020 (PG'20+21, Wellington, New Zealand, November 2021).

O. Texler, J. Fišer, M. Lukáč, J. Lu, E. Shechtman, and D. Sýkora: **Arbitrary Style Transfer Using Neurally-Guided Patch-Based Synthesis.** In *Computers & Graphics*, 87:62–71, 2020 (Expressive 2019, Genova, Italy, May 2019).

W. Yang, N. Marshak, D. Sýkora, S. Ramalingam, and L. Kavan: **Building Anatomically Realistic Jaw Kinematics Model from Data.** In *The Visual Computer* 35(6–8), 2019 (CGI'19, Calgary, Canada, June 2019).

D. Sýkora, O. Jamriška, O. Texler, J. Fišer, M. Lukáč, J. Lu, and E. Shechtman: **StyleBlit: Fast Example-Based Stylization with Local Guidance.** In *Computer Graphics Forum* 38(2):83–91, 2019 (Eurographics, Genova, Italy, May 2019).

W. Yang, H.-S. Seah, Q. Chen, H.-Z. Liew, and D. Sýkora: **FTP-SC: Fuzzy Topology Preserving Stroke Correspondence.** In *Computer Graphics Forum* 37(8):125–135, 2018 (SCA'18, Paris, France, July 2018).

M. Čadík, D. Sýkora, and S. Lee: **Automated Outdoor Depth-Map Generation and Alignment.** In *Computers & Graphics* 74:109–118, 2018.

J. Fišer, P. Asente, S. Schiller, and D. Sýkora: **Advanced Drawing Beautification with Ship-Shape.** In *Computers & Graphics* 56:46–58, 2016 (SBIM'15, Istanbul, Turkey, June 2015).

M. Lukáč, J. Fišer, P. Asente, J. Lu, E. Shechtman, and D. Sýkora: **Brushables: Example-Based Edge-Aware Directional Texture Painting.** In *Computer Graphics Forum* 34(7):257–268, 2015 (PG'15, Beijing, China, October 2015).

J. Fišer, M. Lukáč, O. Jamriška, M. Čadík, Y. Gingold, P. Asente, and D. Sýkora: **Color Me Noisy: Example-Based Rendering of Hand-Colored Animations with Temporal Noise Control** In *Computer Graphics Forum* 33(4):1–10, 2014 (EGSR'14, Lyon, France, June 2014).

G. Noris, D. Sýkora, A. Shamir, S. Coros, B. Whited, M. Simmons, A. Hornung, M. Gross, and R. Sumner: **Smart Scribbles for Sketch Segmentation.** In *Computer Graphics Forum* 31(8):2516–2527, 2012 (Eurographics, Girona, Spain, May 2013).

D. Sýkora, D. Sedláček, S. Jinchao, J. Dingliana, and S. Collins: **Adding Depth to Cartoons Using Sparse Depth (In)equalities.** In *Computer Graphics Forum* 29(2):615–623, 2010 (Eurographics, Norrköping, Sweden, May 2010), **Günter Enderle Best Paper Award**.

D. Sýkora, J. Dingliana, and S. Collins: **LazyBrush: Flexible Painting Tool for Hand-Drawn Cartoons.** In *Computer Graphics Forum* 28(2):599–608, 2009 (Eurographics, Munich, Germany, March 2009).

J. Obert, J. Křivánek, F. Pellacini, D. Sýkora, and S. Pattanaik: **iCheat: A Representation for Artistic Control of Indirect Cinematic Lighting.** In *Computer Graphics Forum* 27(4):1217–1223, 2008 (EGSR'08, Sarajevo, Bosnia, June 2008).

D. Sýkora, J. Buriánek, and J. Žára: **Colorization of Black-and-White Cartoons.** In *Image and Vision Computing*, 23(9):767–852, 2005.

CONFERENCE PAPERS

D. Futschik, M. Chai, C. Cao, C. Ma, A. Stoliar, S. Korolev, S. Tulyakov, M. Kučera, and D. Sýkora: **Real-Time Patch-Based Stylization of Portraits Using Generative Adversarial Network.** In *Proceedings of the 8th ACM/EG Expressive Symposium*, pp. 33–42, 2019 (Expressive 2019, Genova, Italy, May 2019).

O. Texler, J. Fišer, M. Lukáč, J. Lu, E. Shechtman, and D. Sýkora: **Enhancing Neural Style Transfer using Patch-Based Synthesis.** In *Proceedings of the 8th ACM/EG Expressive Symposium*, pp. 43–50, 2019 (Expressive 2019, Genova, Italy, May 2019).

M. Dvorožňák, S. Nejad, O. Jamriška, A. Jacobson, L. Kavan, and D. Sýkora: **Seamless Reconstruction of Part-Based High-Relief Models from Hand-Drawn Images.** In *Proceedings of the Joint Symposium on Computational Aesthetics and Sketch-Based Interfaces and Modeling and Non-Photorealistic Animation and Rendering*, art. no. 5, 2018 (Expressive 2018, Victoria, Canada, August 2018).

J. Fišer, P. Asente, and D. Sýkora: **ShipShape: A Drawing Beautification Assistant.** In *Proceedings of the workshop on Sketch-Based Interfaces and Modeling*, pp. 49–57, 2015 (SBIM'15, Istanbul, Turkey, June 2015).

O. Jamriška, D. Sýkora, and A. Hornung: **Cache-Efficient Graph Cuts on Structured Grids.** In *Proceedings of Conference on Computer Vision and Pattern Recognition*, pp. 3673–3680, 2012 (CVPR'12, Providence, Rhode Island, USA, June 2012).

D. Sýkora, M. Ben-Chen, M. Čadík, B. Whited, and M. Simmons: **TexToons: Practical Texture Mapping for Hand-Drawn Cartoon Animations.** In *Proceedings of the 9th International Symposium on Non-Photorealistic Animation and Rendering*, pp. 75–83, 2011 (NPAR'11, Vancouver, Canada, August 2011), **Best Paper Award**.

G. Noris, D. Sýkora, S. Coros, B. Whited, M. Simmons, A. Hornung, M. Gross, and R. Sumner: **Temporal Noise Control for Sketchy Animation.** In *Proceedings of the 9th International Symposium on Non-Photorealistic Animation and Rendering*, pp. 93–98, 2011 (NPAR'11, Vancouver, Canada, August 2011).

D. Sýkora, J. Dingliana, and S. Collins: **As-Rigid-As-Possible Image Registration for Hand-Drawn Cartoon Animations.** In *Proceedings of the 7th International Symposium on Non-Photorealistic Animation and Rendering*, pp. 25–33, 2009 (NPAR'09, New Orleans, Louisiana, USA, August 2009).

D. Sýkora, D. Sedláček, and K. Riege: **Real-Time Color Ball Tracking for Augmented Reality.** In *Proceedings of the 14th Eurographics Symposium on Virtual Environments*, pp. 9–16, 2008 (EGVE'08, Eindhoven, The Netherlands, May 2008).

D. Sýkora, J. Buriánek, and J. Žára: **Video Codec for Classical Cartoon Animations with Hardware Accelerated Playback.** In *Proceedings of the 1st International Symposium on Visual Computing*, pp. 43–50, 2005 (ISVC'05 Lake Tahoe, Nevada, USA, December 2005).

D. Sýkora, J. Buriánek, and J. Žára: **Sketching Cartoons by Example.** In *Proceedings of the 2nd Eurographics Workshop on Sketch-Based Interfaces and Modeling*, pp. 27–34, 2005 (SBIM'05, Dublin, Ireland, August 2005).

D. Sýkora, J. Buriánek, and J. Žára: **Unsupervised Colorization of Black-and-White Cartoons.** In *Proceedings of the 3rd International Symposium on Non-Photorealistic Animation and Rendering*, pp. 121–127, 2004 (NPAR'04, Annecy, France, June 2004).

D. Sýkora, J. Buriánek, and J. Žára: **Segmentation of Black-and-White Cartoons.** In *Proceedings of the 19th Spring Conference on Computer Graphics*, pp. 233–230, 2003 (SCCG'03, Budmerice, Slovakia, April 2003).

BOOK CHAPTERS   D. Sýkora and J. Dingliana: **Computer-Assisted Repurposing of Existing Animations.** Rosin et al.: Image and Video Based Artistic Stylisation, *Computational Imaging and Vision*, vol. 42, pp. 285–308, Springer, 2013.

PATENTS   M. Dvorožňák, W. Li, V. Kim, and D. Sýkora: **Generating Target-character-animation Sequences Based on Style-aware Puppets Patterned After Source-character-animation Sequences** U.S. Patent No. 10,789,754, September 2020.

J. Fišer, O. Jamriška, D. Simons, E. Shechtman, J. Lu, P. Asente, M. Lukáč, and D. Sýkora: **Generating a Stylized Image or Stylized Animation by Matching Semantic Features via an Appearance Guide, a Segmentation Guide, and/or a Temporal Guide**, U.S. Patent No. 10,504,267, December 2019.

J. Fišer, O. Jamriška, M. Lukáč, E. Shechtman, P. Asente, J. Lu, and D. Sýkora **Controlling Patch Usage in Image Synthesis**, U.S. Patent No. 9,905,054, February 2018.

J. Fišer, O. Jamriška, M. Lukáč, E. Shechtman, P. Asente, J. Lu, and D. Sýkora **Illumination-guided Example-based Stylization of 3D Renderings**, U.S. Patent No. 9,881,413, January 2018.

O. Jamriška, J. Fišer, P. Asente, J. Lu, E. Shechtman, and D. Sýkora: **Appearance Transfer Techniques**, U.S. Patent No. 9,870,638, January 2018.

O. Jamriška, J. Fišer, P. Asente, J. Lu, E. Shechtman, and D. Sýkora: **Appearance Transfer Techniques Maintaining Temporal Coherence**, U.S. Patent No. 9,852,523. December 2017.

G. Noris, D. Sýkora, S. Coros, B. Whited, M. Simmons, A. Hornung, M. Gross, and R. Sumner: **Temporal Noise Control for Sketchy Animation**, U.S. Patent No. 9,123,145. September 2015.

G. Noris, D. Sýkora, A. Shamir, S. Coros, B. Whited, M. Simmons, A. Hornung, M. Gross, and R. Sumner: **Smart Scribbles for Sketch Segmentation**, U.S. Patent No. 9,082,005. July 2015.

O. Jamriška and D. Sýkora: **Optimizing Computation of Minimum Cut in Graphs with Grid Topology**, U.S. Patent No. 8,533,139. September 2013.

H-INDEX   **20** (Google Scholar)

CREDITS   **La mouche de bronze**
Karleener, October 2019.

The Lion King 3D
Walt Disney Pictures, September 2011.

O loupežníku Rumcajsovi (13 episodes)
Czech TV & Universal Production Partners, March 2003.

INVITED TALKS   **Can AI Paint Like an Artist?**
CESCG, Smolenice, Slovak Republic, May 2020.

Artistic Style Transfer Demystified
EuroVis, Brno, Czech Republic, June 2018.

Let the machine become the next Rembrandt!
42nd Pattern Recognition and Computer Vision Colloquium, Prague, Czech Republic, April 2018.

Back to the Roots: Bridging the Gap Between Hand-Drawn and Computer-Generated
33rd Spring Conference on Computer Graphics, Mikulov, Czech Republic, May 2017.

StyLit: Example-Based Stylization of 3D Renderings
22nd Conference on Animation, Effects, Games and Transmedia, Stuttgart, Germany, May 2017.

Helping Charming Hand-Drawn to Survive in Cruel CG
Demobit, Bratislava, Slovakia, January 2017.

Time Lapse Paintings
21st Conference on Animation, Effects, Games and Transmedia, Stuttgart, Germany, April 2016.

Ink-and-Ray: Adding Global Illumination Effects to Hand-Drawn Characters
20th Conference on Animation, Effects, Games and Transmedia, Stuttgart, Germany, May 2015.

Hand-Drawn Animation as Computer Science
Anifilm, International Festival of Animated Films, Třeboň, Czech Republic, May 2015.

TexToons: Practical Texture Mapping for Hand-Drawn Cartoon Animations
17th Conference on Animation, Effects, Games and Transmedia, Stuttgart, Germany, May 2012.

Towards 3D-Like Look of Hand-Drawn Cartoons
29th Pattern Recognition and Computer Vision Colloquium, Prague, Czech Republic, October 2011.

INDIVIDUAL
FUNDING
Fluidymation (Fulbright Visiting Scholar Program 2017/18)
Efficient Painting & Enhancement of Hand-Drawn Cartoon Animations (FP7-ERG-268216)
Computer Assisted Renewal of Classical Cartoon Animations (FP7-IEF-221320)
Automatic Colorization of Hand-Drawn Cartoon Animations (FRVŠ 2005-1170)
Inking Black-and-White Cartoons (FRVŠ 2004-2067)

PROFESSIONAL
ACTIVITIES
Associate Editor: Computer Graphics Forum (2019–present),

Organizing Committee: Eurographics (2007 & 2017), Expressive (2018)

Program Committee: SIGGRAPH (2019), EGSR (2016–2017), Expressive (2013–2019),
GI (2017), SCA (2016), NPAR (2010–2012), CAD/Graphics (2015), IPR (2012)

Reviewer: SIGGRAPH (2006–2020), SIGGRAPH Asia (2009–2020), Eurographics (2005–2017),
TOG (2012–2020), TVCG (2010–2020), CGF (2009–2020), C&G (2012–2018), Expressive (2013–
2017), EGSR (2016–2017), GI (2017), SCA (2016), CHI (2015), CAD/Graphics (2015), PG (2009–
2013), JVCI (2013), JEI (2011–2012), NPAR (2010–2012), SCCG (2006–2012), IPR (2012), CG&A
(2011), STSP (2011), Web3D (2010), ISVC (2009), EGIRL (2009), VIE (2006), VIIP (2006),
WSCG (2007), CESCG (2006).

TEACHING
EXPERIENCE
Advanced Interactive Image Manipulation (A4M39AIM)
Master Course, Faculty of Electrical Engineering, CTU in Prague, 2013–present.

Digital Image Processing (MI-DZO)
Master Course, Faculty of Information Technology, CTU in Prague, 2011–present.

Computer Graphics (CS 4600)
Bachelor Course, School of Computing, University of Utah, 2017.

Graphics Hardware & Realtime Rendering (CS7031)
Master Course, School of Computer Science and Statistics, Trinity College Dublin, 2009–2010.

Group Programming Project (2BA7)
Bachelor Course, School of Computer Science and Statistics, Trinity College Dublin, 2009.

Multimedia & Computer Animation (X36MMA)
Master Course, Faculty of Electrical Engineering, CTU in Prague, 2005–2007.

STUDENT
SUPERVISION

CTU in Prague (9 BS, 25 MS, 6 PhD):
P. Bílek (BS), J. Brejcha (MS), J. Burýšek (MS), P. Diviš (MS), M. Dvorožňák (MS, PhD),
M. Dzurenko (MS), J. Fišer (MS, PhD), D. Futschik (MS, PhD), F. Hauptfleisch (MS),
O. Jamriška (MS), P. Jaškovský (MS), P. Kalinová (MS), J. Keller (MS), P. Krajník (MS),
J. Krupička (MS), T. Krupka (MS), M. Kučera (MS), J. Kula (BS), L. Kunc (MS),
B. Laskov (MS), M. Lukáč (PhD), J. Meloun (MS), M. Mudra (BS), A. Platkevič (MS),
Z. Růta (BS), L. Saidlová (BS, MS), S. Schimper (MS), Š. Sochorová (MS, PhD), M. Stezka (BS),
F. Šůna (BS), M. Svoboda (MS), O. Texler (MS, PhD), P. Ulrichová (BS), R. Vávra (BS).

Trinity College Dublin (3 MS):
S. Jinchao (MS), J. Warren (MS), S. O'Brien (MS).

TECHNOLOGY
TRANSFERS

Algorithm for **example-based stylization of videos** [Jamriška et al. 2019] was implemented by *Secret Weapons* and released as **EbSynth** (2019). The tool is being used for production of stylized movies, e.g., **La mouche de bronze** (2019) or **iMucha** (2020).

Algorithm **FaceStyle** [Fišer et al. 2017] was intergrated into **Adobe Character Animator** (2018).

Algorithm **GridCut** [Jamriška et al. 2012] was licensed to *Adobe* (2019), *Siemens* (2016), *Samsung* (2015), *Autodesk* (2014), *Disney* (2013), *Nokia* (2013), and 19 other companies.

Algorithms **LazyBrush** [Sýkora et al. 2009] and **TexToons** [Sýkora et al. 2011] were licensed to *TVPaint Development* (2013) and integrated into TVPaint Animation 11 Professional Edition software (2015). They are used in traditionally animated movies, e.g., **The Red Turtle** (2016).

Algorithms for **image registration** [Sýkora et al. 2009] and **adding depth** [Sýkora et al. 2010] were reimplemented at *Disney* (2010) and used for stereo conversion of **The Lion King 3D** movie (2011).

Algorithm for **colorization** [Sýkora et al. 2005] was licensed to *Universal Production Partners* (2002) and used for colorization of 13 episodes of **O loupežníku Rumcajsovi** serial (2003).