David Kouřil

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SUMMARY / PROFILE

David Kouřil is a researcher with strong technical skills and a formal background in computer science. He specializes in applications of real-time graphics in scientific visualization where he's interested in interactions with complex data and virtual environments. In his graduate studies, he focused on biological data, developing techniques that make this data more accessible and understandable to general audience.

EDUCATION

Mar 2017 - (ongoing): **Doctoral Degree** (Dr.techn.) @ TU Wien (AT) 🇦🇹

- Topic: Interactive visualization of multiscale biological data
- Supervisor: Ivan Viola
- Highlight: IEEE Vis 2018 Best Paper Honorable Mention (SciVis)

Sep 2014 - Feb 2017: **Master's Degree** (Mgr.) @ Masaryk University (CZ) 🇨🇿

- Field: Computer Graphics
- Thesis: "Maya2CellVIEW: Integrated Tool for Creating Large and Complex Molecular Scenes" (graded A / Excellent)

Sep 2011 - Jun 2014: **Bachelor's Degree** (Bc.) @ Masaryk University (CZ) 🇨🇿

- Field: Computer Graphics and Image Processing
- Thesis: "Fast region labeling of binary images" (graded A / Excellent)

EXPERIENCE

Mar 2017 - now: **Project Assistant** @ TU Wien

- Main researcher for 3 research projects
  - Labels on Levels: labeling for molecular scenes
  - HyperLabels: multi-scale navigation
  - Molecumentary: virtual tours of molecular models
- Provided support to students and external collaborators with the Marion library
- Collaborated with international experts from both visualization and biology domain

Jul 2016 - Feb 2017: **Project Assistant Without Degree** @ TU Wien

- Integrated several research prototypes into a unified demo which was then submitted to the VIZZIES challenge (organized by National Science Foundation)
- Ported a high-performance molecular rendering technique (cellVIEW) from DirectX to OpenGL for a new proprietary library (called Marion)
    - This code was later used in commercialization of the Marion library by a spin-off company Nanographics GmbH
- Implemented nano-scale rendering of microtubules for project contracted by Allen Institute For Cell Science

Jun 2015 - Sep 2015: **QA Intern** @ Solarwinds

- Summer internship, performed both manual and automated software testing

Feb 2015 - Jun 2015: **Seminar Lecturer** @ Masaryk University

- Delivered seminar lectures in the course PV112 Computer Graphics APIs

Aug 2012 - Apr 2013: **C++ programmer** @ Celebrio

- Participated in development of a mobile game for tablet devices

TALKS

HyperLabels: Browsing of Dense and Hierarchical Molecular 3D Models (conference paper presentation) @ IEEE Vis 2020, Salt Lake City (USA), October 2020 (given remotely). [recording]

Navigating and Exploring 3D Biological Environments (invited talk) @ Visualization II course, Masaryk University, Brno (CZ), April 2020 (given remotely).

Navigating and Exploring 3D Biological Environments @ CellVis Summit, KAUST (Saudi Arabia), November 2019. [recording]

Labels on Levels: Labeling of Multi-Scale Multi-Instance and Crowded 3D Biological Environments (conference paper presentation) @ IEEE Vis 2018, Berlin (DE), October 2018. [recording]

Challenges and advances in multi-scale biology data visualization (invited talk), Czech Technical University, Prague (CZ), November 2017.

COMMUNITY SERVICE

Reviewing: IEEE Vis 2018 (InfoVis), EuroVis 2019, CESCG 2019, IEEE TVCG (Jan2020), IEEE Vis 2020 (InfoVis, SciVis)

EuroVis 2018: Fast Forward Chair, Student Volunteer

PUBLICATIONS

D. Kouřil, O. Strnad, P. Mindek, S. Halladjian, T. Isenberg, M. E. Gröller, I. Viola, “Molecumentary: Scalable Narrated Documentaries Using Molecular Visualization”, November 2020, preprint, arXiv:2011.02418 [cs.HC].

D. Kouřil, T. Isenberg, B. Kozlíková, M. Meyer, M. E. Gröller, I. Viola, “HyperLabels: Browsing of Dense and Hierarchical Molecular 3D Models”, *IEEE Transactions on Visualization and Computer Graphics*, Early Access, accepted February 2020. Doi: 10.1109/TVCG.2020.2975583

S. Halladjian, H. Miao, **D. Kouřil**, M. E. Gröller, I. Viola, T. Isenberg, "ScaleTrotter: Illustrative Visual Travels Across Negative Scales", *IEEE Transactions on Visualization and Computer Graphics*, 26(1):654-664, January 2020. Doi: 10.1109/TVCG.2019.2934334

H. Miao, T. Klein, **D. Kouřil**, P. Mindek, K. Schatz, M. E. Gröller, B. Kozlíková, T. Isenberg, I. Viola, “Multiscale Molecular Visualization”, *Journal of Molecular Biology*, 431(6):1049-1070, March 2019. Doi: 10.1016/j.jmb.2018.09.004

D. Kouřil, L. Čmolík, B. Kozlíková, H-Y. Wu, G. Johnson, D. Goodsell, A. Olson, M. E. Gröller, I. Viola, “Labels on Levels: Labeling of Multi-Scale Multi-Instance and Crowded 3D Biological Environments”, *IEEE Transactions on Visualization and Computer Graphics*, 25(1):977-986, January 2019. Doi: 10.1109/TVCG.2018.2864491

T. Koch, **D. Kouřil**, T. Klein, P. Mindek, I. Viola, “Semantic Screen-Space Occlusion for Multiscale Molecular Visualization”, *Eurographics Workshop on Visual Computing for Biology and Medicine*, 197-201, September 2018. Doi: 10.2312/vcbm.20181245

P. Mindek, **D. Kouřil**, J. Sorger, D. Toloudis, B. Lyons, G. Johnson, M. E. Gröller, I. Viola, “Visualization Multi-Pipeline for Communicating Biology”, *IEEE Transactions on Visualization and Computer Graphics*, 24(1):883-892, January 2018. Doi: 10.1109/TVCG.2017.2744518