

## CURRICULUM VITAE

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### PERSONAL INFORMATION

Name **Zuzana Kukelova**  
Date of birth October 17<sup>th</sup>, 1981  
Website <http://kukelova.weebly.com>  
ORCID 0000-0002-1916-8829  
ResearcherID M-7938-2016

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### EDUCATION

2006-2013 **PhD**, Computer Vision, *Czech Technical University in Prague*, Prague, Czech Republic  
2005 **Doctor of Natural Science** (RNDr.), Computer Graphics and geometry, *Comenius University*, Bratislava, Slovakia  
2004-2005 **Master**, Computer Graphics and geometry, *Comenius University*, Bratislava, Slovakia  
2000-2003 **Bachelor degree equivalent**, Mathematics, *Comenius University*, Bratislava, Slovakia

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### PHD THESIS

Title *Algebraic Methods in Computer Vision*  
Supervisor Tomas Pajdla  
Defence October 21<sup>st</sup>, 2013  
Jury Andrew Fitzgibbon (Microsoft Research Cambridge), Rekha R. Thomas (University of Washington), Fredrik Kahl (Lund University)  
Awards Dean's Prize, 2013 CSKI Prize, 2015 Cor Baayen Award

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### CURRENT POSITION

03/09/2016-present **Research assistant**, *Czech Technical University*, Prague, Czech Republic

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### PREVIOUS POSITIONS

09/2014-09/2016 **Post-Doctoral Researcher**, *Microsoft Research Cambridge*, UK  
10/2005-08/2014 **Research assistant**, *Czech Technical University*, Prague, Czech Republic

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### AWARDS

2015 The winner of the 2015 [Cor Baayen Award](#) - an annual award given to a promising young researcher in computer science and applied mathematics by ERCIM – The European Research Consortium for Informatics and Mathematics. The award was created in 1995 to honour the first ERCIM President.  
2014 The 12th Asian Conference on Computer Vision (ACCV 2014) - Best Paper Honourable Mention  
2013 CSKI (Czech Society for Cybernetics and Informatics) prize for the best 2013 PhD dissertation in cybernetics and informatics in the Czech Republic (1<sup>st</sup> place)  
2013 Dean prize for prestigious PhD thesis  
2012 Spotlight Paper for the July 2012 issue of the IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI)  
2005 1<sup>st</sup> place at SlovakPrix MultiMedia 2005 in category Special award for

- students (project SketchCo)  
 2005 1<sup>st</sup> place at SVOC 2005 (Student Scientific activities) - Czech & Slovak final round - section Applied Informatics  
 2005 Toshiyasu Lawrence KUNII Award 2005

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### INVITED PRESENTATIONS

- 06/2014 *Algebraic Methods in Computer Vision*, Computational Nonlinear Algebra, ICREM Topical Workshop, Providence, RI, USA  
 11/2012 *Solving Minimal Problem in Computer Vision*, Seminar in Numerical Geometry, Comenius University, Bratislava, Slovakia  
 04/2012 *Making Minimal Solvers Fast*, The 30th Pattern Recognition and Computer Vision Colloquium, Prague  
 11/2011 *Solving Minimal Problems in Computer Vision*, AIME@CZ – Czech workshop on applied mathematics in engineering, Prague  
 05/2011 *Algebraic Methods in Computer Vision*, DISI, Università degli Studi di Genova, Italy  
 12/2008 *Solving Minimal Problems in Computer Vision*, Absolvents week, Comenius University, Bratislava, Slovakia  
 08/2008 *Solving Minimal Problems in Computer Vision*, Workshop on Trends in Computer Vision, Rosenön, Sweden  
 04/2007 *A minimal solution to the autocalibration of radial distortion*, Spring 2007 Pattern Recognition and Computer Vision Colloquium, Prague

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### ORGANISATION OF INTERNATIONAL CONFERENCES

- CVVW 2018 **Co-chair** of 23<sup>rd</sup> *Computer Vision Winter Workshop, CVVW 2018*, Cesky Krumlov, Czech Republic  
 ICCV 2015 **Co-organizer** of the tutorial – The Art of Solving Minimal Problems, Tutorial International Conference on Computer Vision 2015 (ICCV'15)  
 CVVW 2014 **Co-chair** of 19<sup>th</sup> *Computer Vision Winter Workshop, CVVW 2014*, Křtiny, Czech Republic

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### OTHER RESEARCH ACTIVITIES

- Reviewer **Reviewer** for computer vision journals and conferences  
 IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI),  
 International Journal of Computer Vision (IJCV),  
 Computer Vision and Image Understanding (CVIU),  
 The IEEE Conference on Computer Vision and Pattern Recognition (CVPR),  
 International Conference on Computer Vision (ICCV),  
 European Conference on Computer Vision (ECCV),  
 Asian Conference on Computer Vision (ACCV)
- Participation in **International Conferences (with active presentation):**  
 conferences CVPR 2007, ICCV 2007, CVPR 2008, BMVC 2008, ECCV 2008, ACCV 2009, ICCV 2009, ACCV 2010, CVPR 2012, ACCV 2012, 3DV 2013, AMOS 2013, ICCV 2013, ACCV 2014, CVPR 2015, ICCV 2015, CVPR 2016, CVPR 2017
- Summer Schools and Workshops [Workshop on Algebraic Vision, American Institute of Mathematics](#), San Jose, 2016.  
[DIRAC Summer Workshop](#), Leuven, Belgium 2009.  
[DIRAC Cognitive Science summerschool](#), Volterra, Italy, 2008.

[DIRAC/CoSy workshop on Multi-Sensory Modalities in Cognitive Science](#),  
Gerzensee, Switzerland, 2007.

Research code **Co-author of research code** – Automatic generator of minimal problem solvers, Several [solvers](#) for minimal relative and absolute pose problems

Contributor to EC funded projects *PRoViDE FP7-SPACE-2012-312377*,  
*De-Montes FP7-SME-2011-285839*,  
*PRoVisG FP7-SPACE-2007-218814*,  
*DIRAC FP6-IST-027787*

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## FUNDINGS AND GRANTS

Received grants SGS10/072/OHK4/1T/13 – Algebraic Methods in Computer Vision, Student grant competition 2010, Czech Technical University in Prague. 2010.  
CTU grant No. CTU0806613 - Solving Systems of Polynomial Equations for Minimal Problems in Computer Vision, Czech Technical University in Prague. 2009.

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## INDUSTRIAL COLLABORATION

2013-present **Capturing Reality, Slovakia** – consultant, “Minimal problems in SfM pipelines”

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## TEACHING EXPERIENCE

2016-2017 **Optimization (OPT)**, Labs, Czech Technical University in Prague

2012-2014 **Geometry of Computer Vision and Graphics (GVG)**, Course and Labs, Czech Technical University in Prague

2012-2014 **Advanced Robotics (PRO)**, Course and Labs, Czech Technical University in Prague

2010-2012 **3D Computer vision (TDV)**, Labs, Czech Technical University in Prague

2009-2011 **Theoretical basics of computer vision, graphics and interaction (TZ)**, Labs, Czech Technical University in Prague

2009-2010 **Math of continuous world (MSS)**, Labs, Czech Technical University in Prague

2006-2008 **Intelligent Robotics (IRO)**, Labs, Czech Technical University in Prague

2005 **Computer Graphics**, Labs, University of Ss. Cyril and Methodius, Trnava, Slovakia

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## MENTORING EXPERIENCE

2017-2018 **PhD Co-Supervisor** – *Cenek Albl*

2016 **Intern Supervisor** – *Cenek Albl*, Project: Multi-camera system calibration, Microsoft Research Cambridge, UK

2015 **Intern Supervisor** – *Filip Srajer*, Project: Automatic differentiation, Microsoft Research Cambridge, UK

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## INSTITUTIONAL RESPONSIBILITIES

2013-2014 **Member of Academic senate AS FEL** – *Faculty of Electrical Engineering*, Czech Technical University in Prague

2007 **Member of Academic senate AS CVUT** – Czech Technical University in Prague

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## JOURNAL PUBLICATIONS

- Citations according to Google Scholar – June 2017(excluding self-citations)
- FoCM 2017 J. Kileel, Z. Kukelova, T. Pajdla, B. Sturmfels. Distortion varieties. Foundations of Computational Mathematics, July 2017. (IF 2.829)
- PAMI 2012 Z. Kukelova, M. Bujnak, and T. Pajdla. Polynomial eigenvalue solutions to minimal problems in computer vision. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 34(7):1381–1393, 2012. (**Spotlight paper, IF 4.795**), Citations: 22
- CVA 2012 M. Bujnak, Z. Kukelova, and T. Pajdla. Efficient solutions to the absolute pose of cameras with unknown focal length and radial distortion by decomposition to planar and non-planar cases. *IPSJ Transaction on Computer vision and Application (CVA)*, 4:78–86, May 2012.
- PAMI 2011 Z. Kukelova and T. Pajdla. A minimal solution to radial distortion autocalibration. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 33(12):2410–2422, December 2011. (**IF 4.908**), Citations: 20
- CVIU 2010 Z. Kukelova, M. Byröd, K. Josephson, T. Pajdla, and K. Åström. Fast and robust numerical solutions to minimal problems for cameras with radial distortion. *Computer Vision and Image Understanding*, 114(2):234–244, February 2010. (**IF 2.404**), Citations: 13

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## CONFERENCE PUBLICATIONS

- Citations according to Google Scholar – June 2017 (excluding self-citations)
- CVPR 2018 V. Larsson, Z. Kukelova, Y. Zheng, Camera Pose Estimation with Unknown Principal Point. In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR'18)*, 2018, (to appear)
- CVPR 2018 V. Larsson, M. Oskarsson, K. Astroem, A. Wallis, Z. Kukelova, T. Pajdla Beyond Gröbner Bases: Basis Selection for Minimal Solvers. In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR'18)*, 2018, (to appear)
- CVPR 2018 J. Pritts, Z. Kukelova, V. Larsson, O. Chum. Radially-Distorted Conjugate Translations. In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR'18)*, 2018, (to appear)
- ICCV 2017 V. Larsson, Z. Kukelova, Y. Zheng, Making Minimal Solvers for Absolute Pose Estimation Compact and Robust, In *IEEE International Conference on Computer Vision (ICCV'17)*. 2017.
- CVPR 2017 Z. Kukelova, J. Kileel, T. Pajdla, B. Sturmfels. A Clever Elimination Strategy for Efficient Minimal Solvers. In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR'17)*, 2017 (Acceptance rate 29%)
- CVPR 2017 C. Albl, Z. Kukelova, A. Fitzgibbon, J. Heller, M. Smid, T. Pajdla. On the Two-View Geometry of Unsynchronized Cameras. In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR'17)*, 2017 (Acceptance rate 29%)
- CVPR 2016 Z. Kukelova, J. Heller, A. Fitzgibbon. Efficient Intersection of Three Quadrics and Applications in Computer Vision. In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR'16)*, 2016 (Acceptance rate 29.9%), Citations: 1
- CVPR 2016 C. Albl, Z. Kukelova, T. Pajdla. Rolling Shutter Absolute Pose Problem With Known Vertical Direction. In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR'16)*, 2016 (Acceptance rate 29.9%)
- AD 2016 F. Srajer, Z. Kukelova, A. Fitzgibbon. A Benchmark of Selected Algorithmic

- Differentiation Tools on Some Problems in Machine Learning and Computer Vision. *7th International Conference on Algorithmic Differentiation (AD 2016)*, Oxford, 2016
- ICCV 2015 Z. Kukelova, J. Heller, M. Bujnak, A. Fitzgibbon, T. Pajdla. Efficient Solution to the Relative Pose Problem for Radially Distorted Cameras. , *In IEEE International Conference on Computer Vision (ICCV'15)*. 2015. (Acceptance rate 30.92%)
- CVPR 2015 C. Albl , Z. Kukelova, T. Pajdla. R6P - Rolling Shutter Absolute Camera Pose. In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR'15)*, 2015 (**Oral Presentation, Acceptance rate 3.3%**), Citations: 7
- CVPR 2015 Z. Kukelova, J. Heller, M. Bujnak, T. Pajdla. Radial Distortion Homography In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR'15)*, 2015. (Acceptance rate 28%)
- ACCV 2014 Z. Kukelova, M. Bujnak, J. Heller, T. Pajdla. Singly-Bordered Block-Diagonal Form for Minimal Problem Solvers. In *12th Asian Conference on Computer Vision (ACCV'14)*, Singapore, 2014, (**Oral presentation, Acceptance rate 3.9%, Best Paper Honourable Mention**) , Citations: 2
- ICCV 2013 Z. Kukelova, M. Bujnak, T. Pajdla, Real-time solution to the absolute pose problem with unknown radial distortion and focal length, In *IEEE International Conference on Computer Vision (ICCV'13)*, Sydney, Australia, 2013. (Acceptance rate 27.9%), Citations: 17
- AMOS 2013 Z. Kukelova, P. Krsek, V. Smutny and T. Pajdla Groebner basis solutions to satellite trajectory control by pole placement. In *Proceedings of the Advanced Maui Optical and Space Surveillance Technologies Conference (AMOS'13)*, 2013.
- 3DV 2013 Z. Kukelova, M. Bujnak, and T. Pajdla. Fast and stable algebraic solution to L2 three-view triangulation, In *International conference on 3d vision (3DV'13)*, Seattle, USA, June, 2013. Citations: 1
- ACCV 2012 Z. Kukelova, J. Heller and T. Pajdla. Hand-Eye Calibration without Hand Orientation Measurement Using Minimal Solution. In *11th Asian Conference on Computer Vision (ACCV'12)*, 2012 (Acceptance rate 26.6%), Citations: 3
- CVPR 2012 M. Bujnak, Z. Kukelova, and T. Pajdla. Making Minimal Solvers Fast. In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR'12)*, 2012. (Acceptance rate 24.1%), Citations: 6
- ACCV 2010 M. Bujnak, Z. Kukelova, and T. Pajdla. New efficient solution to the absolute pose problem for camera with unknown focal length and radial distortion. In *10th Asian Conference on Computer Vision (ACCV'10)*, volume 6492 of *Lecture Notes in Computer Science*, pages 11–24, 2011. (**Oral Presentation, Acceptance rate 4.7%**), Citations: 33
- ACCV 2010 Z. Kukelova, M. Bujnak, and T. Pajdla. Closed-form solutions to minimal absolute pose problems with known vertical direction. In *10th Asian Conference on Computer Vision (ACCV'10)*, volume 6493 of *Lecture Notes in Computer Science*, pages 216–229, 2011. (Acceptance rate 29.1%), Citations: 42
- CVVT 2010 A. Torii, Z. Kukelova, M. Bujnak, and T. Pajdla. The six point algorithm revisited. In *10th Asian Conference on Computer Vision (ACCV'10 Workshop, CVVT:E2M)*, volume 6469 of *Lecture Notes in Computer Science*, pages 184–193, 2011, Citations: 3
- ICCV 2009 M. Bujnak, Z. Kukelova, and T. Pajdla. 3D reconstruction from image collections with a single known focal length. In *IEEE International Conference on Computer Vision (ICCV'09)*, pages 1803–1810, 2009.

- (Acceptance rate 23.2%), Citations: 15
- ACCV 2009 M. Bujnak, Z. Kukelova, and T. Pajdla. Robust focal length estimation by voting in multi-view scene reconstruction. In *9th Asian Conference on Computer Vision (ACCV'09)*, pages 13–24, 2009. (**Oral Presentation, Acceptance rate 5.2%**), Citations: 4
- ECCV 2008 Z. Kukelova, M. Bujnak, and T. Pajdla. Automatic Generator of Minimal Problem Solvers. In *10th European Conference on Computer Vision (ECCV'08)*, volume 5304 of *Lecture Notes in Computer Science*, pages 302–315, 2008. (Acceptance rate 27.9%), Citations: 74
- CVPR 2008 M. Byröd, Z. Kukelova, K. Josephson, T. Pajdla, and K. Åström. Fast and robust numerical solutions to minimal problems for cameras with radial distortion. In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR'08), Vols 1-12*, pages 234–244, 2008. (**Oral presentation, acceptance ratio 4.0%**), Citations: 27
- CVPR 2008 M. Bujnak, Z. Kukelova, and T. Pajdla. A general solution to the p4p problem for camera with unknown focal length. In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR'08), Vols 1-12*, pages 3506–3513, 2008. (Acceptance rate 31.8%), Citations: 83
- BMVC 2008 Z. Kukelova, M. Bujnak, and T. Pajdla. Polynomial eigenvalue solutions to the 5-pt and 6-pt relative pose problems. In *British Machine Vision Conference (BMVC'08)*, 2008, (**Oral presentation, acceptance ratio 12.5%**), Citations: 44
- OMNIVIS 2007 Z. Kukelova and T. Pajdla. Two minimal problems for cameras with radial distortion. In *7th Workshop on Omnidirectional Vision, Camera Networks and Non-classical Cameras (OMNIVIS'07)*, 2007. Citations: 17
- CVPR 2007 Z. Kukelova and T. Pajdla. A minimal solution to the autocalibration of radial distortion. In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR'07)*, 2007. (Acceptance rate 28.2%), Citations: 40
- CVWW 2007 Z. Kukelova and T. Pajdla. Solving polynomial equations for minimal problems in computer vision. In *Computer Vision Winter Workshop (CVWW'07)*, Graz, Austria, 2007.