Natural Sciences and Engineering Research Council of Canada

Conseil de recherches en sciences naturelles et en génie du Canada

FORM 100
Personal Data Form
PART I

Family name	Given name	Initial(s) of all given names	Personal identification no. (PIN)
Lang	Jochen	J	**Valid** 206301

☐ I hold a faculty position at an eligible Canadian college (complete Appendices B1 and C)

☐ I do not or will not hold an academic appointment at a Canadian postsecondary institution

Place of employment other than a Canadian postsecondary Institution (give address in Appendix A)

APPOINTMENT AT A POSTSECONDARY INSTITUTION

Title of position
Associate Professor

Department

Campus

Canadian postsecondary institution

Tenured or tenure-track academic appointment   Yes [X]   No [ ]

Part-time appointment [ ]   Full-time appointment [X]

- For all non-tenured or non tenure-track academic appointment and Emeritus Professors, complete Appendices B & C
- For life-time Emeritus Professor and part-time positions, complete Appendix C

ACADEMIC BACKGROUND

Degree	Name of discipline	Institution	Country	Date yyyy/mm
Dipl-IngFH	Elektrotechnik Electrical&Electronic	Fachhochschule Ulm	GERMANY	1992 / 07
Bachelor's	Electrical & Electronic Engineering	University of Plymouth	UNITED KINGDOM	1992 / 07
Master's	Computer Science	York	CANADA	1996 / 11
Doctorate	Computer Science	British Columbia	CANADA	2001 / 11

TRAINING OF HIGHLY QUALIFIED PERSONNEL

Indicate the number of students, fellows and other research personnel that you:

	Currently		Over the past six years (excluding the current year)		
	Supervised	Co-supervised	Supervised	Co-supervised	Total
Undergraduate	1		4		5
Master's	3	1	8	2	14
Doctoral		1	1	3	5
Postdoctoral				1	1
Others			1		1
Total	4	2	14	6	26

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ACADEMIC, RESEARCH AND INDUSTRIAL EXPERIENCE (use one additional page if necessary)			
Position held (begin with current)	**Organization**	**Department**	**Period (yyyy/mm to yyyy/mm)**
Associate Professor	Ottawa	Electrical Engineering and Computer Science , School of	2010/06
Assistant Professor	Ottawa	School of Information Technology and Eng	2004/09 to 2010/05
Researcher	Max-Planck-Institut für Informatik, Saarbrücken, Germany.	AG 4	2002/02 to 2004/09
Post-Doctoral Researcher	University of British Columbia, Vancouver, BC, Canada.	Computer Science	2001/10 to 2002/01
Scientific and Vision Computing Consultant	Point Grey Research, Vancouver, BC, Canada.	n/a	1999/10 to 2002/01
Software Development Engineer	Informatik Systemtechnik, Stuttgart, Germany.	Control Systems	1992/10 to 1994/08
Industrial Internship	Kodak AG, Stuttgart, Germany.	Copier- and Printsystems Development	1990/03 to 1990/08
Industrial Internship	AEG, Ulm, Germany.	various	1987/09 to 1988/02
Military Service	German Bundeswehr.	n/a	1986/07 to 1987/09

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RESEARCH SUPPORT

Family name and initial(s) of applicant	Title of proposal, funding source and program, and time commitment (hours/month)	Amount per year	Years of tenure (yyyy)
List all sources of support **(including NSERC grants and university start-up funds)** held as an applicant or a co-applicant: a) support held in the past four (4) years but now completed; b) support currently held, and c) support applied for. For group grants, indicate the percentage of the funding directly applicable to your research. Use additional pages as required.			

a) Support held in the past 4 years

Jochen Lang and 1 other	An Off-the-Shelf Video Camera Array for Three-Dimensional Television NSERC RTI - Category 1 20 hours/month	28,700 (50%)	2008
Jochen Lang	Interactive Acquisition of the Physical World NSERC Discovery Grant 40 hours/month	20,000 20,000 20,000 20,000 20,000	2008 2009 2010 2011 2012
Eric Dubois and 2 others	High-Quality Acquisition and Rendering of Image-Based Models for Tele-Presence in Remote Environments NSERC Strategic Project Grants 30 hours/month	126,150 (33%) 146,950 (33%) 140,150 (33%)	2008 2009 2010
Jochen Lang	Auto-Digitization with Artistic Style for Embroidery Design NSERC CRD 10 hours/month	33,500(100%) 33,500(100%)	2010 2011

RESEARCH SUPPORT			
Family name and initial(s) of applicant	**Title of proposal, funding source and program, and time commitment (hours/month)**	**Amount per year**	**Years of tenure (yyyy)**
List all sources of support **(including NSERC grants and university start-up funds)** held as an applicant or a co-applicant: a) support held in the past four (4) years but now completed; b) support currently held, and c) support applied for. For group grants, indicate the percentage of the funding directly applicable to your research. Use additional pages as required.			

a) Support held in the past 4 years

Jochen Lang	Image-based registration of a patrolling mobile robot NSERC Engage 10 hours/month	25,000	2011
Jochen Lang	Computer Vision Modules for Increased Autonomy of a Patrolling Officer Robot Federal, Applied Research and Development Initiative, FedDev SME4SME 20 hours/month	92,000	2012
Jochen Lang	Extended panel methods for computation of flows around solid objects for computer graphics applications Mitacs Accelerate 10 hours/month	15,000(100%)	2012
Jochen Lang	A Vortex Particle Fluid Simulator (Prototype Development Exocortex) Ontario Ministry of Energy, Science and Technology Ont. Network of Exellence, iPoP 10 hours/month	10,000	2012

	Personal identification no. (PIN)	Family name
	Valid 206301	Lang

RESEARCH SUPPORT

Family name and initial(s) of applicant	Title of proposal, funding source and program, and time commitment (hours/month)	Amount per year	Years of tenure (yyyy)
List all sources of support **(including NSERC grants and university start-up funds)** held as an applicant or a co-applicant: a) support held in the past four (4) years but now completed; b) support currently held, and c) support applied for. For group grants, indicate the percentage of the funding directly applicable to your research. Use additional pages as required.			

b) Support currently held

Family name and initial(s) of applicant	Title of proposal, funding source and program, and time commitment (hours/month)	Amount per year	Years of tenure (yyyy)
Jochen Lang	GRAND NSERC NCE Collaborating Network Investigator (CNI) 10 hours/month	16,000 16,000 12,500 11,000	2010 2011 2012 2013
Jochen Lang	Computational Photography for Capturing Virtual Environments NSERC Discovery Grant 40 hours/month	15,000 15,000 15,000 15,000 15,000	2013 2014 2015 2016 2017
Jochen Lang and 1 other	A high-resolution omnidirectional video camer for computational photography NSERC RTI 20 hours/month	26,175 (50%)	2013

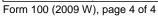**PROTECTED WHEN COMPLETED**   Version française disponible

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Highly Qualified Personnel (HQP)

Provide personal data about the HQP that you currently, or over the past six years, have supervised or co-supervised.

	Personal identification no. (PIN)	Family name
	Valid 206301	Lang

Name	Type of HQP Training and Status	Years Supervised or Co-supervised	Title of Project or Thesis	Present Position
Fanping Zhou	Master's (In Progress)	Supervised 2012 -	High dynamic range panoramic imaging of dynamic scenes	Master's student (part-time), University of Ottawa
Hong Pan	Master's (In Progress)	Supervised 2012 -	Advanced user interface for haptic image exploration	Master's student, University of Ottawa
Phillips, Adon	Undergraduate (In Progress)	Supervised 2012 -	Complex environment sensing autonomous robot	Undergraduate student, University of Ottawa
Motahareh Tekieh	Master's (In Progress)	Supervised 2011 -	Registration of deformable 3D models	Master's Student, University of Ottawa
Ziyun Li	Master's (In Progress)	Co-supervised 2011 -	Experience-based haptic rendering of object interactions	Master's Student, University of Ottawa
Andres Solis Montero	Doctoral (In Progress)	Co-supervised 2010 -	Change detection in image-based virtual environments	Ph.D. student, University of Ottawa
Mauricio Vines	Doctoral (Completed)	Co-supervised 2011 - 2013	Vortex methods for fluid simulaton in computer graphics	Physical animation software developer, Exocortex
(Name withheld)	Undergraduate (Completed)	Supervised 2012 - 2012	Optical flow methods for aligning photos for HDR imaging	Unknown
Edmunds, Corey	Undergraduate (Completed)	Supervised 2012 - 2012	Shadow detection using paired regions	Undergraduate student, University of Ottawa
Zhang, Fan	Res. Associate (Completed)	Supervised 2011 - 2012	Hierarchical image segmentation	Undergraduate student, University of Pennsylvania
Ana Laura Perez	Master's (Completed)	Supervised 2010 - 2012	Segmentation and line filling of 2D shapes	Research associate, University of Ottawa
Alan Brunton	Doctoral (Completed)	Co-supervised 2007 - 2012	Multi-scale methods for omnidirectional stereo with app.	Researcher, Max Planck Institute for Informatics
Antonio Rosa da Silva Jr	Doctoral (Not Completed)	Supervised 2010 - 2011	Auto-digitization with artistic style	Programme Manager, TMF Group B. V.
David Lareau	Master's (Completed)	Supervised 2009 - 2011	Haptic image exploration	Software Game Developer, Fuel Industries, Ottawa
Silk, Simon	Master's (Completed)	Supervised 2009 - 2011	Ghost removal for HDR image-based environments	Development Engineer, Alcatel-Lucent, Ottawa
Oliver Walzer	Master's (Completed)	Supervised 2007 - 2011	Filter. of seg. hier. for impr. region-to-region matching	CTO, sploomy AG, Hünenberg, Switzerland
Jamal Saboune	Postdoctoral (Completed)	Co-supervised 2009 - 2010	High-quality acquistion of image-based virtual environments	Research Associate, University of Ottawa
Ting Yu	Master's (Completed)	Supervised 2007 - 2010	Stereo-based 3D model acquisition and motion detection	Software Quality Engineer. Adobe, Ottawa
Vijaya L. Guruswamy	Master's (Completed)	Co-supervised 2008 - 2009	Measurement and modelling of haptic textures	VRE developer, Robertson Library, UPEI
Thomas Byczkowski	Master's (Completed)	Supervised 2006 - 2009	Stereo-based system with inertial navigation for 3D scanning	Instrumentation and Electronics Specialist, NRC, Ottawa

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Highly Qualified Personnel (HQP)

Provide personal data about the HQP that you currently, or over the past six years, have supervised or co-supervised.

		Personal identification no. (PIN)		Family name	
		Valid 206301		Lang	

Name	Type of HQP Training and Status	Years Supervised or Co-supervised	Title of Project or Thesis	Present Position
Yi Zhang	Doctoral (Completed)	Co-supervised 2007 - 2008	Real-time object shape acquisition	Researcher, Tianjin University, China
Mac Donald, Darren	Master's (Completed)	Supervised 2005 - 2008	Hierarchical image segments for analysis and visualization	Graphics Services Developer, IBM
Guimond, Sylvain	Undergraduate (Completed)	Supervised 2007 - 2007	Kayboard accelerometers for a game user interface	unknown
Kolhatkar, Shanat	Undergraduate (Completed)	Supervised 2007 - 2007	Real-time BRDF rendering based on measurements	Independent Game Developer at Freelance
Mothe, Purnima	Master's (Not Completed)	Supervised 2006 - 2007	Consumer haptics	unknown
Andrews, Sheldon	Master's (Completed)	Co-supervised 2005 - 2007	Meas.-b. modeling of contact forces & textures for haptic r.	Ph.D. student, McGill University

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I. Most Significant Contributions to Research and/or to Practical Applications

1. Interactive Acquisition of Haptic Textures and Surface Compliance

    We developed an interactive scanning approach for the acquisition of physical surface textures. This is our first step in making physical capture more general and inexpensive. The method uses a hand-held force-sensing pen and camera system for tracking the user interaction with an object's surface. The acquired texture model is based on scanned surface profiles but also includes an estimation of the compliance of the surface. Preliminary results were reported for the acquisition in [II.17] and the rendering in [II.18] but the major contribution is the compliance acquisition method reported in [II.3] along with various other improvements. I have conducted this work with my (former) student Sheldon Andrews.

    Subsequently, I have extended the work by modelling the surface texture as acceleration textures. The textures are represented with Infinite Impulse Response Filters placed over the surface of a rendered object. This representation models more directly the measured response during user interaction with the surface and results in high fidelity rendering of the haptic texture. The method has been reported in [II.4] with experimental work contributed by the former co-supervised Master's student Vijaya Guruswamy. Our work has been cited by leading researchers in the field.
    (Funding: NSERC Discovery and some initial funding from ORDC ORNEC)

2. Auto-digitization

    Many applications can benefit from the semi-automatic parsing of image content, vectorization and hierarchical organization of shapes. We have worked on this topic in the context of embroidery design and in the context of haptic image exploration, but many more applications exist. The automated translation process of an artist's design, the artwork, to a stitch pattern, the embroidery design, is referred to in the embroidery industry as auto-digitization. Currently, there is no automated process capable of producing embroidery designs with equivalent quality to hand digitization.

    We have made progress on analyzing shapes [II.2] and the auto break-up process (proprietary algorithm; currently unpublished). These two contributions have been developed in the context of a NSERC CRD grant in close cooperation with a Canadian embroidery software maker. This project also provided the framework for the undergraduate thesis of Corey Edmunds, which received the IBM Cognos Prize for the best undergraduate thesis project in the Winter term 2012. We have worked as well on the actual image analysis and developed a semi-automatic hierarchical image vectorization for haptic image exploration [II.9]. Even though these two applications seem unrelated, the underlying key technology is the ability to organize image content with respect to objects in the scene and then translate them into a different display modality: stitch pattern or haptic display. We prefer a hierarchical representation in order to be able to represent objects at varying scale and subobjects as part of larger objects. The immediate impact of this very recent work is through the collaboration with a Canadian SME.
    (Funding: NSERC CRD and NSERC NCE)

3. Visual Surface Tracking of Deformable Objects

Visual surface tracking of deformable objects is a long-standing problem in computer vision with practical application in, e.g., visual inspection, computational medicine and computer animation. Different approaches have been proposed including extending optical flow to 3D range flow, fitting deformable models to 2D or 3D image data and deformable registration methods. We have investigated two alternative approaches, both based on an isometry constraint on the surface. In our first approach (with former Master's student Ting Yu), we developed a range-flow technique using simple window-based matching, however, we incorporated a novel isometry constraint. Based on seed points from KLT (Kanade-Lucas-Tomasi) feature tracking, we used the novel constraint to find a dense set of matches on the surface of deformable object in a time sequence of 3D pointclouds obtained with a stereo-vision camera. We also demonstrated the robustness of the constraint if the surface deformation violates the assumption of isometry. Our paper received the best student paper award at the Canadian Conference on Computer and Robot Vision in 2010. More recently we (with collaborators Drs. Wuhrer and Shu) have developed a surface registration technique that uses a state-of-the-art energy optimization including a smoothness term based on Euclidean and geodesic matching distance. This method is able to register a time sequence of surface pointclouds of a deformable object. However, our main contribution is a technique to track a complete object with an elastic model solved with finite elements with a pointcloud captured from a single viewpoint. This makes our method very practical as we demonstrated by tracking objects with pointclouds obtained by a commercial stereo-vision system and alternatively, with a consumer-grade structured light scanner (Microsoft Kinnect) and I expect the work to be adapted because of it.
(Funding: NSERC Discovery and NSERC NCE)

II. Research Contributions and Practical Applications

Papers in refereed journals:

1. **M. Vines**, B. Houston, J. Lang and W. Lee, Vortical inviscid flows with two-way solid-fluid coupling, *IEEE Trans. on Visualization and Computer Graphics*, 14 pages, accepted, June 2013. (Funding: Mitacs, OMRI iPoP)

2. **D. Lareau** and J. Lang, An instrument for haptic image exploration, *IEEE Trans. on Instrumentation and Measurement*, 10 pages, accepted May 2013. (Funding: NSERC NCE GRAND)

3. **S. Silk** and J. Lang, High dynamic range image deghosting by fast approximate background modeling, *Computers and Graphics*, 36(8), 2012. (Funding: NSERC SPG)

4. **A.S. Montero** and J. Lang, Skeleton pruning by contour approximation and the integer medial axis transform, *Computers and Graphics (Special Issue on SMI)*, 36(5), pp. 477-487, 2012. (Funding: NSERC CRD)

5. J. Lang and **S. Andrews**, Measurement-based modeling of contact forces and textures for haptic rendering, *IEEE Trans. on Visualization and Computer Graphics*, 17(3), pp. 380-391, 2011. (Funding: NSERC Discovery)

6. **V.L. Guruswamy**, J. Lang and W.-S. Lee, IIR-filter models of haptic vibration textures, *IEEE Trans. on Instrumentation and Measurement*, 60(1), pp. 93-103, 2011. (Funding: NSERC Discovery)

7. **A. Brunton**, J. Lang and E. Dubois, Spherical harmonic transforms and convolutions on the GPU, *Journal of Graphics, GPU, and Game Tools*, 15(1), pp. 13-27, 2010 (Funding: NSERC SPG)

Papers in refereed conference and workshop proceedings:

8. **A. Brunton**, J. Lang and E. Dubois, Time- and space-efficient multi-scale stereo of high-resolution planar and spherical images, in Proc. *3DimPVT*, 8 pp., Zurich, Switzerland, Oct. 2012. (Funding: NSERC Discovery)

9. S. Wuhrer, J. Lang and C. Shu, Tracking complete deformable objects with finite elements, in Proc. *3DimPVT*, 8 pp., Zurich, Switzerland, Oct. 2012. (Funding: NSERC Discovery and NCE GRAND)

10. **D. Lareau** and J. Lang, Haptic rendering of photographs, in Proc. *Int. Symposium on Haptic Audio Visual Environments and Games - HAVE 2012*, 6 pp., Munich, Germany, Oct. 2012. (Funding: NSERC NCE GRAND)

11. **S. Silk** and J. Lang, Fast High Dynamic Range Image Deghosting for arbitrary scene motion, in Proc. *Graphics Interface*, Toronto, Canada, May 2012. (Funding: NSERC SPG and Discovery)

12. **A.S. Montero**, H. Sekkati, J. Lang, R. Laganire and J. James, Framework for natural landmark-based robot localization, in Proc. *Computer and Robot Vision '12*, pp. 131-138, Toronto, Canada, May, 2012 (Funding: NSERC Engage)

13. **A. Brunton**, C. Shu, J. Lang and E. Dubois, Wavelet Model-based Stereo for Fast, Robust face reconstruction, in Proc. *Computer and Robot Vision '11*, pp. 347-354, St.-John's, NL, Canada, May 2011. (Funding: NSERC SPG)

14. **T. Yu** and J. Lang, Window-based range flow with an isometry constraint, in Proc. *Computer and Robot Vision '10*, pp. 331-338, Ottawa, Canada, May 2010. (Funding: NSERC Discovery)

    This paper was the co-winner of the best student paper award at CRV 2010.

15. **V.L. Guruswamy**, J. Lang and W.S. Lee, Modelling of haptic vibration textures with infinite-impulse-response filters, in Proc. *8th IEEE Int. Workshop on Haptic Audio Visual Environments and Games - HAVE 2009*, pp. 105-110, (Funding: NSERC Discovery)

16. **T. Byczkowski** and J. Lang, A stereo-based system with inertial navigation for outdoor 3D scanning, in Proc. *Computer and Robot Vision '09*, pp. 221-228, Kelowna, Canada, May, 2009. (Funding: NSERC Discovery)

17. **D. MacDonald** and J. Lang, Bitmap to vector conversion for multi-level analysis and visualization, in Proc. *6th International Conference on Scalable Vector Graphics*, Nuremberg, Germany, August, 2008. (Funding: NSERC Discovery)

18. **S. Andrews** and J. Lang, Haptic texturing based on real-world Samples, in Proc. *IEEE Int. Workshop on Haptic Audio Visual Environments and their Applications – HAVE*, pp. 142-147, Ottawa, Canada, October 2007. (Funding: NSERC Discovery, ORDC ORNEC; see description in [I.2])

19. **S. Andrews** and J. Lang, Interactive scanning of haptic textures and surface compliance, in Proc. *6th International Conference on 3-D Digital Imaging and Modeling (3DIM07)*, IEEE, pp. 99-106, Montréal, August, 2007. (Funding: NSERC Discovery, ORDC ORNEC; see description in [I.2]

Non-Refereed Contributions:

20. **D. Lareau** and J. Lang, Haptic image exploration, *GRAND Annual Conference*, Poster Presentation, Vancouver, Canada, May, 2011. (Funding: NSERC NCE)

21. **D. Lareau** and J. Lang, Interactive exploration of images with ambient haptic context, *GRAND Annual Conference*, Poster Presentation. Ottawa, Canada, May, 2010. (Funding: NSERC NCE)

Contributions to Practical Applications of Knowledge

We contributed computer vision technology consisting of tracking planar targets for localization (Contr. [II.11]). The successful transfer of the technology to the industrial partner in this NSERC Engage project led to a follow-up project funded through the FedDev SME4SME program.
We developed shape analysis and shape segmentation software in the framework of the NSERC CRD project "Auto-Digitization with Artistic Style for Embroidery Design" (see also [I.2]).

III. Other Evidence of Impact and Contributions:

Member, Program Committee, British Machine Vision Conference, since 2011.
(Senior) Member, Program Committee, Computer Graphics International, 2011, 2012.
Member, Review Committee, Int. Conf. on Multimedia and Expo, since 2011.
(Quality Reviewer *Award*, 2011)
Member, Program Committee, 3DV, 2013.
Member, Program Committee, IEEE Multimedia and Signal Proc., 2013
Member, Program Committee, 3DIMPVT, 2011, 2012.
Member, Program Committee, Canadian Conf. on Comp. and Robot Vision, 2012, 2013.
Member, Review Committee, IEEE Virtual Reality, 2011.
Registration Chair, AI/GI/CRV 2010
Member, Program Committee, Short Papers, Eurographics 2010
Member, Program Committee, Int. Fall Workshop on Vision, Modeling, and Visualization, 2007-2009.
Member, Program Committee, Int. Workshop/Conf. on 3-D Digital Imaging and Modeling, IEEE, 2007, 2009.
Member, Program Committee, Future Play, 2007-2010.
Member, Program Committee, IEEE HAVE, since 2006.
Member, Program Committee, IEEE ROSE, since 2008.
Member, Editorial Board, International Journal of Advanced Media and Communication, since 2006.

Reviewer for the following: Computer Graphics Forum, IEEE Trans. on Visualization & Computer Graphics, IEEE Trans. on Haptics, Int. J. of Robotics Research, IEEE Computer Graphics & Applications, ACM Trans. on Multimedia, Presence, IEEE Trans. on SMC-A, IEEE Trans. on Instrumentation and Measurement (Outstanding Reviewer *Award* 2011), Image and Vision Computing, Machine Vision and Applications, Medical Image Analysis, Int. J. of Adv. Media and Communication, WorldHaptics, Graphics Interface.

IV. Contributions to the Training of Highly Qualified Personnel (HQP)

In training of HQP, I emphasize familiarity with concepts from applied mathematics paired with implementation skills. This combination is essential for my research focusing on experimental methods for computer graphics and computer haptics based on techniques from computer vision.

I actively seek industrial partners for research collaborations to provide students the opportunity to interact with potential future employers. The direct feedback from industry motivates students to stay on schedule and to focus on the project at hand. I have been working with Cohort System Inc. to develop computer vision modules for registration, tracking and change detection to increase the autonomy of patrolling mobile robot in security applications. This collaboration ties in with the research of doctoral student Andres S. Montero and already led to jointly co-authored publication [II.11]. Recently, I have worked with Pulse Microsystems Inc. to analyze and enhance their auto-digitization process to transform vector and raster image artwork into an embroidery design which three graduate and on undergraduate researcher. My collaboration with Exocortex Technologies Inc. is concerned with a simulator for turbulent flow modelling for computer animation and is helping another doctoral student gain expertise.

I regularly seek co-supervisory arrangements to make sure that students have access to all areas of expertise required for their thesis work. For example, I have co-supervised the Ph.D. student A. Brunton contributing my expertise in visual computing with Dr. Dubois contributing his knowledge about frequency analysis in image processing. Also, I am currently co-supervising the Ph.D. student A.S. Montero, contributing my expertise in virtual environments while Dr. Laganière contributes his research expertise in structure-from-motion. In these and other co-supervisions, I give the co-supervised students the same attention as student in sole supervisions.

I like to foster the appreciation of related work with regular meetings of a discussion group and by working through reading lists with individual students. I give students the opportunity to practice their presentation skills during group meetings and expect students to present their work at scientific venues. I value excellence in student's work at all levels exhibited by an undergraduate student, Corey Edmunds, co-winning the IBM Cognos Prize for the best undergraduate thesis project in the Winter term 2012, a recent Master's student, Ting Yu, winning the best student paper award at Computer and Robot Vision 2010 [II.13], and by another recent Master's student, Simon Silk, receiving a nomination by for the University of Ottawa thesis prize for 2012.

As a result, students who have worked with me in the past, pursue their academic careers further or are employed as software developers in a field corresponding to their thesis work.

Natural Sciences and Engineering Research Council of Canada

Conseil de recherches en sciences naturelles et en génie du Canada

**APPENDIX A
Personal Data
(Form 100)**

Complete this appendix (i) if you are an applicant or co-applicant applying for the first time; (ii) if you need to update information submitted with a previous application; or (iii) if you do not hold an appointment at a Canadian postsecondary institution. For updates, include only the revised information in addition to the date, your name and your PIN.

This information will be used by NSERC primarily to contact applicants and award holders. It may also be used to identify prospective reviewers and committee members, and to generate statistics. It will not be seen or used in the adjudication process.

Date
2013/06/11

Family name	Given name	Initial(s) of all given names	Personal identification no. (PIN)
Lang	Jochen	J	**Valid** 206301

Position and complete mailing address if your primary place of employment is not a Canadian postsecondary institution or if your current mailing address is temporary	If address is temporary, indicate:
Eberhard-Karls-Universitat Tübingen Informatik, Computergrafik Sand 14 72076 Tübingen GERMANY	**Starting date** 2012/08/01 **Leaving date** 2013/07/31

Telephone number	Facsimile number	E-mail address
1 (613) 5625800 6317	(613) 5625175	jlang@eecs.uottawa.ca

Telephone number (alternate)	Give an alternate telephone number only if you can be reached at that number during business hours.	Gender (completion optional)
		X Male ☐ Female

LANGUAGE CAPABILITY

English	Read	X	Write	X	Speak	X
French	Read	X	Write		Speak	

I wish to receive my correspondence: in English X   in French ☐

AREA(S) OF EXPERTISE

Provide a maximum of 10 key words that describe your area(s) of expertise. Use commas to separate them. If you have expertise with particular instruments and techniques, specify which one(s).	Research subject code(s)
Computer graphics, Computer vision, Computational photography, Measurement-based modelling, Physics-based modelling, Computer haptics, Light transport, 3D Modelling, Stereo vision	Primary 2707 Secondary 2716

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Appendix D (Form 100)
Consent to Provide Limited Personal Information About
Highly Qualified Personnel (HQP) to NSERC

NSERC applicants are required to describe their contributions to the training or supervision of highly qualified personnel (HQP) by providing certain details about the individuals they have trained or supervised during the six years prior to their current application. HQP information must be entered on the Personal Data Form (Form 100). This information includes the trainee's name, type of HQP training (e.g., undergraduate, master's, technical etc.) and status (completed, in-progress, incomplete), years supervised or co-supervised, title of the project or thesis, and the individual's present position.

Based on the federal *Privacy Act* rules governing the collection of personal information, applicants are asked to obtain consent from the individuals they have supervised before providing personal data about them to NSERC. In seeking this consent, the NSERC applicant must inform these individuals what data will be supplied, and assure them that it will only be used by NSERC for the purpose of assessing the applicant's contribution to HQP training. To reduce seeking consent for multiple applications, applicants will only need to seek consent one time for a six-year period. If the trainee provides consent by e-mail, the response must include confirmation that they have read and agree to the text of the consent form.

When consent cannot be obtained, applicants are asked to not provide names, or other combinations of data, that would identify those supervised. However, they may still provide the type of HQP training and status, years supervised or co-supervised, a general description of the project or thesis, and a general indication of the individual's present position if known.

An example of entering HQP information on Form 100 (with and without consent):

Name	Type of HQP Training and Status	Years Supervised or Co-supervised	Title of Project or Thesis	Present Position
Consent Received from Marie Roy				
Roy, Marie	Undergraduate (Completed)	Supervised 1994 - 1997	Isotope geochemistry in petroleum engineering	V-P (Research), Earth Analytics Inc., Calgary, Alberta
Consent Not Obtained from Marie Roy				
(name withheld)	Undergraduate (Completed)	Supervised 1994 - 1997	Isotope geochemistry	research executive in petroleum industry - western Canada

Consent Form

Name of Trainee

Applicant Information

Name   Lang, Jochen J

Department	Postsecondary Institution
Electrical Engineering and Computer Science ,	Ottawa

I hereby allow the above-named applicant to include limited personal data about me in grant applications submitted for consideration to NSERC for the next six years. This limited data will only include my name, type of HQP training and status, years supervised or co-supervised, title of the project or thesis and, to the best of the applicant's knowledge, my position title and company or organization at the time the application is submitted. I understand that NSERC will protect this data in accordance with the *Privacy Act*, and that it will only be used in processes that assess the applicant's contributions to the training of highly qualified personnel (HQP), including confidential peer review.

_____   _____
Trainee's signature   Date

Note: This form must be retained by the applicant and made available to NSERC upon request.