

XIN CHEN

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SUMMARY OF ACCOMPLISHMENTS

Dr. Xin Chen is a Senior Engineering Manager and Research Scientist in the Highly Automated Driving organization at HERE.

Demonstrated Leadership in Cutting Edge Big Geospatial Data Research and Development

Xin leads the DeepX group in large scale geospatial data analysis and visualization to create next generation high definition maps using computer vision, pattern recognition, machine learning, image processing, and cloud based and real-time technologies. In such capacity, he supervises engineering managers, lead research scientists and developers, as well as teams of academic collaborators at institutions such as Carnegie Mellon U, Columbia U, Northwestern U, New York U, UCLA, and U of Notre Dame. Xin manages 40 full time research scientists, developers and interns in Chicago, Berkeley, and Mumbai and directs the activities of a team of 200 employees in Mumbai exclusively dedicated to HD map automation using deep learning technologies.

Proven Track Record in Both Research and Production Organizations

Xin worked in the Research organization from 2006-2012, where he prototyped sign recognition, traffic signal detection, road detection from satellite imagery and other automatic feature extraction approaches using imagery and LIDAR. He worked in the Core Platform organization from 2012-2015, where he prototyped automatic road feature extraction from LIDAR and imagery, and map learning from vehicle sensor probe data. Since 2015 he has worked in the Highly Automated Driving organization developing automatic HD map and localization geometry creation for autonomous driving.

Great Working Relationship with Many Organizations at HERE

Xin provides technical insights for Corporate Development team in due diligence of potential acquisitions and partners such as EarthMine, Intel, Baidu and NavInfo. Xin works closely with HR recruiting team to spearhead innovative hiring strategies and participate in recruiting events. Many of Xin's former students have been hired at HERE. He also supports sales and marketing to generate great publicity and demonstrates thought leadership for the company. Xin is not only a prolific inventor working with HERE legal team but he also brings in external inventors to contribute to HERE's patent portfolio. Xin plays a consulting role for organizations such as Research, Core Map, Core Platform, and Automotive for their automated content creation projects.

Deep Experience Leading University Collaborations

Xin developed the framework for HERE's university outreach program and grew the program during his eleven years at NAVTEQ/Nokia/HERE from the ground up. Xin has significant experience drafting and negotiating university collaboration, licensing, work-for-hire and other intellectual property agreements on behalf of NAVTEQ/Nokia/HERE in connection with the university outreach program. He also serves as a principal investigator in several joint research grant proposals with universities and other corporations. Xin has secured over \$700,000 in funding from NAVTEQ/Nokia/HERE and structured research collaborations on big geospatial data analysis with U.S. universities. Xin has served on an NSF (National Science Foundation) panel to evaluate and award funding to multi-million dollar research projects.

Novel Thinking and Publication Potential is Demonstrated by Significant Patent Production

Xin has been awarded sixteen U.S. Patents, over 30 filed and pending patent applications, 2010 and 2011 IMPACT awards to recognize "employees making outstanding contributions" (the most prestigious award at NAVTEQ), an award recognizing "Significant Intellectual Property Contributors" at Nokia for 2011-2012, 2013 and 2014 company-wide Hack Week top awards for a project on 3D city model rendering and a project on HD traffic (Xin's team placed first of over 60 teams competing company-wide globally) and 2015 HERE Berkeley site Hackathon top award for a prototype of lane modeling using deep neural network.

Demonstrated Strong Academic Ties through Adjunct Professorship at 2 Leading Chicago Area Universities: Northwestern University and the Illinois Institute of Technology

Xin currently teaches a “Geospatial Vision and Visualization” and a “Biometrics” course at the undergraduate and graduate levels as an adjunct professor in the Computer Science Department of the Illinois Institute of Technology (since Fall 2010) and in the Electrical Engineering and Computer Science Department of Northwestern University (since Fall 2012). He is also a Ph.D. advisor at both universities. Xin has been invited to speak on large scale geospatial data visualization and automatic feature extraction technologies at various top-notch U.S. universities. He has numerous publications in big geospatial data analysis and visualization, pattern recognition, computer vision, multimedia, and biometrics. Xin has served as a program chair and on the committee for several premium international conferences and workshops, leveraging both his industry and academic contacts to secure sponsorship and increase participation levels.

The “Biometrics” course is an extension on Xin’s Ph.D. research focused on face recognition and modelling in the AI domain. His pioneer infrared face recognition research made strides in overcoming the illumination challenge and in establishing the infrared modality as a viable alternative for face recognition. His comparative work involving the 2D intensity, infrared, and 3D modalities inspired him to create a stereo-based approach to face recognition that delivers superior 3D performance, and also proves inexpensive, flexible, and minimally intrusive, unlike 3D commercial scanners. This approach ultimately outperforms its closest commercial 3D counterpart in face recognition experiments.

EDUCATION

University of Notre Dame, Notre Dame, IN

Ph.D., Computer Science and Engineering, May 2006

M.S., Computer Science and Engineering, May 2003

University of Science and Technology of China, Anhui, China

B.B.A., Business Administration; Management Information Systems, May 2001

B.E., Computer Science, May 2001

EXPERIENCE

HERE

Senior Engineering Manager and Research Scientist, June 2006 to Present, Chicago, IL

- Manage and build 5 teams across sites in the U.S. and India with a total of 30 full time researchers and developers and direct activities for a team of 200 employees in Mumbai focusing on HD map automation using deep learning and computer vision technologies
- Lead teams in every phase of next generation mapping research and development in an Agile software development paradigm
- Supervise employees and teams of academic collaborators performing large scale geospatial data analysis and visualization research
- Draft and negotiate university research collaboration, licensing, work-for-hire and other intellectual property agreements in collaboration with staff attorneys
- Manage university-outreach program initiative and research collaboration
- Serve as a principal investigator in joint research grant proposals with universities and corporations
- Evaluate companies and technologies in the context of acquisition and/or collaboration opportunities

Nokia Technologies

University Cooperation Ambassador, Chicago, IL February 2014 to December 2015

- Collaborate to create framework for academic collaboration
- Identify and liaise with academic inventors to submit patentable ideas to Nokia
- Participate in periodic update meetings with Nokia Technologies leadership to adjust parameters for targeted collaborators

Illinois Institute of Technology

Adjunct Professor in Computer Science Department, August 2010 to Present, Chicago, IL

- Teach a “Geospatial Vision and Visualization” and a “Biometrics” course to both undergraduate and graduate students; this course was converted from a special topic course to a regular Computer Science course by faculty vote
- Co-advise a Ph.D. candidate on Building Shape Completion Based on Large Scale Mobile LIDAR Data Mining

Northwestern University

Adjunct Assistant Professor in Electrical Engineering and Computer Science Department, September 2012 to Present, Evanston, IL

- Teach a “Geospatial Vision and Visualization” and a “Biometrics” course to both undergraduate and graduate students
- Co-advise a Ph.D. candidate on big geospatial data analysis

National Science Foundation

Panelist in the Information and Intelligent Systems Division, 2015

- Evaluate and award funding to multi-million dollar research projects

University of Notre Dame

Research Assistant in Computer Vision Research Lab, August 2001 to June 2006, Notre Dame, IN

- Research face recognition in novel modalities, *i.e.* 2D, 3D and infrared

Equinox Corporation

Research Intern, May 2005 to September 2005, Baltimore, MD

- Research automatic target recognition system to identify moving vehicles in the real world

PROFESSIONAL LEADERSHIP ROLES

Area Chair, Multimedia Technology for Autonomous Vehicles, ACM Multimedia, 2017

Chair, University Grand Challenge, ITS World Congress, 2016

Thesis Examiner, Australia National University, 2016

Guest Editor, Special Issue on Computational Transportation Science, GeoInformatica, 2015

Contest Chair, ACM SIGSPATIAL GIS Cup, 2014, 2015

Panelist, Synergistic Advances of CyberGIS and Integrated Digital and Spatial Studies, University of Illinois at Urbana Champaign, 2014

Panel Moderator, Automated Mobility: How Environment Awareness Technologies will “Drive” Intelligent Transportation of the Future, International Conference on Data Engineering, 2014

Workshop Chair, International Workshop on Computational Transportation Science, 2014

Local Chair, IEEE International Conference on Data Engineering, 2014

Publicity Chair, ACM SIGSPATIAL International Conference on Advances in GIS, 2012, 2013

Corporate Relations Chair, IEEE International Conference on Computer Vision and Pattern Recognition (CVPR), 2012

Local Chair, ACM SIGSPATIAL International Conference on Advances in GIS, 2011

Publicity Chair, 3D Imaging Modeling Processing Visualization and Transmission, 2011

Technical Program Chair, ACM Multimedia, 2010

Industrial & Demo Program Chair, ACM SIGMM International Conference on Multimedia Information Retrieval, 2010

INVITED TALKS ON LARGE SCALE GEOSPATIAL DATA ANALYSIS AND VISUALIZATION

Invited Seminar at the Robotics Group, Imperial College London, 2014

Invited Seminar at the Computer Science Department, Queen Mary University London, 2014

Invited Seminar at the Geography Department, Northern Illinois University, 2012

Colloquium at the Transportation Research and Analysis Computing Center, Argonne National Lab, 2012

Invited Seminar at the Electrical Engineering and Computer Science Department, Northwestern University, 2012
Invited Seminar at the Information Sciences and Technology College, The Pennsylvania State University, 2010
Invited Talk at the Midwest University Industry Summit, Purdue University, 2010
Invited Seminar at the Computer Science Department, Purdue University, 2010
Invited Seminar at the Computational Transportation Science Program, University of Illinois at Chicago, 2010
Invited Seminar at the Robotics Institute, Carnegie Mellon University, 2009
Invited Seminar at the Electrical Engineering Department, Columbia University, 2009
Invited Seminar at the Computer Science Department, University of Wisconsin at Madison, 2009
Invited Seminar at the Beckman Institute, University of Illinois at Urbana Champaign, 2009
Invited Seminar at the Computer Science and Engineering Department, University of Notre Dame, 2009
Invited Seminar at the McCormick School of Engineering and Applied Science, Northwestern University, 2009
Invited Seminar at the Computer Science Department, Indiana University Purdue University at Indianapolis, 2009

INDUSTRY GRANT BASED RESEARCH COLLABORATION

Secure a gift fund from HERE and lead a research collaboration with Dr. Yi Fang and Dr. Ed Wong from New York University on HD mapping for urban autonomous driving, 2016
Secure a gift fund from HERE and lead a research collaboration with Dr. Goce Trajcevski from Northwestern University on maps, sensors, compression and data fusion for autonomous driving, 2016
Secure a gift fund from HERE, a Nokia company, and lead a research collaboration with Dr. Junzhou Huang from University of Texas at Arlington on sensor data mining and machine learning, 2014
Secure a research contract from Nokia and lead a research collaboration with Dr. Junzhou Huang from University of Texas at Arlington on computer vision and image processing, 2014
Secure a research contract from Nokia and lead a research collaboration with Dr. Ruigang Yang from University of Kentucky on 3D computer vision, 2014
Secure a research contract from Nokia and lead a research collaboration with Dr. Song-Chun Zhu from University of California at Los Angeles on computer vision, 2014
Secure a gift from Nokia and negotiate and structure a collaboration with Interprofessional Projects Program (IPRO) from the Illinois Institute of Technology on an IPRO course development, 2013
Secure a gift from Nokia and negotiate and structure a collaboration with Interprofessional Projects Program (IPRO) from the Illinois Institute of Technology on an IPRO course development, 2012
Secure a research contract from Nokia and lead a research collaboration with Dr. Gady Agam from the Illinois Institute of Technology on Building Completion, 2012
Secure a gift fund from Nokia and lead a research collaboration with Dr. Gady Agam from Illinois Institute of Technology on 3D Campus Mapping, 2011
Secure and structure a research contract with Dr. Song-Chun Zhu from University of California at Los Angeles on building and text extraction from street view imagery, 2011
Secure and structure a research contract with Dr. Song-Chun Zhu from University of California at Los Angeles on face and license plate extraction from street view imagery, 2010
Secure and structure a research contract with Dr. Song-Chun Zhu from University of California at Los Angeles on road sign extraction from street view imagery, 2010
Secure a gift fund from NAVTEQ and lead a research collaboration with Dr. Takeo Kanade from Carnegie Mellon University and Dr. James Wang from Penn State University on Street View Scene Understanding, 2008

Secure a gift fund from NAVTEQ and lead a research collaboration with Dr. Patrick Flynn from University of Notre Dame on 3D LIDAR Mapping, 2008

FEDERAL GRANT APPLICATIONS

NIST Forensic Science Center of Excellence Program, 2014. Xin was a PI on behalf of Northwestern University collaborating with other colleagues from Penn State University.

NSF III: Large: Collaborative Research: Dynamic Exploration of Evolving Semantics Using Multimodal Heterogeneous Sensors, 2014. Xin was a co-PI on behalf of Northwestern University collaborating with other colleagues from NWU, Rutgers and NCSU.

Adaptive and collaborative 3D reconstruction, recognition, and tracking of objects and activities using a network of sensors, a white paper for Computational Methods for Decision Making 2011. Xin was a PI on behalf of NAVTEQ in a proposed collaboration with the Illinois Institute of Technology and University of Notre Dame.

Guidelines for the Use of Mobile LIDAR in Transportation Applications, a proposal to TRB NCHRP solicitation 2010. Xin was a PI on behalf of NAVTEQ in collaboration with the Dynasty Group, Inc.

Geo-referenced 3D Indoor Mapping, a proposal to NIJ solicitation 2010. Xin was a PI on behalf of NAVTEQ in collaboration with the University of Notre Dame.

3D Geo-reference Mapping, a proposal to TSWG BAA 2009. Xin was a PI on behalf of NAVTEQ in collaboration with the University of Notre Dame.

A Volumetric Approach to LIDAR Denoising and Compression, a proposal to NURI 2009. Xin was a PI on behalf of NAVTEQ in collaboration with the University of Wisconsin-Madison.

U.S. PATENTS

Over 30 U.S. Patent Applications Filed and Pending (Details Available Upon Request)

U.S. Patent 9,497,478, Predictive Value Data Set Compression, Roman Ostrovskiy, Xin Chen, 2016

U.S. Patent 9,349,189, Occlusion resistant image template matching using distance transform, Xi Zhang, Xin Chen, 2016

U.S. Patent 9,466,108, Method and apparatus for multiple image registration in the gradient domain, Xin Chen, Junzhou Huang, 2016

U.S. Patent 9,424,672, Method and apparatus for processing and aligning data point clouds, Alex Zavodny, Xin Chen, 2016

U.S. Patent 9,418,446, Method and apparatus for determining a building location based on a building image, Xin Chen, Andi Zang, 2016

U.S. Patent 9,384,398, Method and apparatus for roof type classification and reconstruction based on two dimensional aerial images, Xin Chen, Andi Zang, Xi Zhang, 2016

U.S. Patent 9,361,797, Detecting road condition changes from probe data, Xin Chen, Vlad Zhukov, 2016

U.S. Patent 8,953,838, Detection Ground Geographic Features in Images Based on Invariant Components, Xin Chen, Xiangheng Yang, 2015

U.S. Patent 8,896,686, Determining A Geometric Parameter from a Single Image, Xin Chen, Xiangheng Yang, Roger Hui, and Narayanan Alwar, 2014

U.S. Patent 8,854,453, Determining geographic position information from a single image, Xin Chen, Xiangheng Yang, Roger Hui, and Narayanan Alwar, 2014

U.S. Patent 8,761,435, Detecting geographic features in images based on invariant components, Xin Chen, 2014

U.S. Patent 8,699,755, Determining travel path features based on retroreflectivity, Matei Stroila, Xin Chen, Masha Kamali, Victor Lu, 2014

U.S. Patent 8,086,071, System and method for revealing occluded objects in an image dataset, Xin Chen and William Gale, 2010

U.S. Patent 9,129,163, Detecting Common Geographic Features in Images Based on Invariant Components, Xin Chen, 2010

PUBLICATIONS

Counting and Classification of Highway Vehicles by Regression Analysis. Mingpei Liang, Xinyu Huang, Chung-Hao Chen, Xin Chen, Alade Tokuta, IEEE Transactions on Intelligent Transportation Systems, 2015

Fusion of Color Images and LiDAR Data for Lane Classification. Xiaodong Gu, Andi Zang, Xinyu Huang, Alade Tokuta, Xin Chen, ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems (GIS), 2015.

ACM SIG SPATIAL GIS CUP 2014: Constrained Generalization. Siva Ravada, Xin Chen, Zhi Liu, Xi Zhang, ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems (GIS) 2014

Learning Synthetic Models for Roof Style Classification in Point Clouds. Xi Zhang, Gady Agam and Xin Chen, ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems (GIS) 2014

Textured Mesh Generation of Extracted Regions from Urban Range-Scanned LIDAR Data. Alexandri Zavodny, Patrick Flynn and Xin Chen, Workshop on Hot Topics in 3D Multimedia in conjunction with IEEE International Conference on Multimedia and Expo (ICME) 2011

City-Scale Landmark Identification on Mobile Devices. David Chen, Georges Baatz, Kevin Koeser, Sam Tsai, Ramakrishna Vedantham, Timo Pylvanainen, kimmo Roimela, Xin Chen, Jeff Bach, Marc Pollefeys, Bernd Girod, Radek Grzeszczuk, IEEE Computer Society Conference on Computer Vision and Pattern Recognition (CVPR) 2011

A Multimedia Approach to Visualize and Interact with Large Scale Mobile LIDAR Data. James Lynch, Xin Chen and Roger Hui, Technical Demo, ACM Multimedia 2010

Denoising vs. Deblurring: HDR Imaging Techniques Using Moving Cameras. Li Zhang, Alok Deshpande and Xin Chen, IEEE Computer Society Conference on Computer Vision and Pattern Recognition (CVPR) 2010

Tag Dictionaries and Its Applications. Qingxiong Yang, Bing Jian and Xin Chen, Industrial and Technical Demo, ACM SIGMM International Conference on Multimedia Information Retrieval (MIR) 2010

Next Generation Map Making: Geo-referenced Ground-level LIDAR Point Clouds for Automatic Retro-reflective Road Feature Extraction. Xin Chen, Matei Stroila, Ruisheng Wang, Brad Kohlmeyer, Narayanan Alwar and Jeff Bach, ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems (GIS) 2009

Region Extraction in Large-scale Urban LIDAR Data. Alexandri Zavodny, Patrick Flynn and Xin Chen, International Workshop on 3-D Digital Imaging and Modeling in conjunction with IEEE International Conference on Computer Vision (ICCV) 2009

Towards Next Generation Map Making. Xin Chen, Matei Stroila, James Lynch, Narayanan Alwar, Brad Kohlmeyer, Jeff Bach and Roger Hui, Media Information Analysis for Personal and Social Applications in conjunction with IEEE International Conference on Multimedia and Expo (ICME) 2009

Web 2.0 Dictionary. Qingxiong Yang, Gang Wang and Xin Chen (ranked 7th of the top 100 downloaded ACM SIGMM articles from July to October, 2008), ACM International Conference on Image and Video Retrieval (CIVR) 2008

Face Recognition Using 2D, 3D, and Infra-Red: Is Multi-Modal Better than Multi-Sample? Kyong Chang, Kevin Bowyer, Patrick Flynn and Xin Chen, Proceedings of the IEEE 2006

Modeling the Human Face Through Multiple View Three-Dimensional Stereopsis: A Survey and Comparative Analysis of Facial Recognition Over Multiple Modalities. Xin Chen, PhD Dissertation 2006

Human Face Modeling & Recognition Through Multi-View High Resolution Stereopsis. Xin Chen, Timothy Faltemier, Patrick Flynn and Kevin Bowyer, Workshop on Biometrics in association with IEEE Computer Society Conference on Computer Vision & Pattern Recognition (CVPR) 2006

Fusion of Infrared and Range Data: Multi-modal Face Images. Xin Chen, Patrick Flynn and Kevin Bowyer, International Conference on Biometrics 2006

Fully Automated Facial Symmetry Axis Detection in Frontal Color Images. Xin Chen, Patrick Flynn and Kevin Bowyer, IEEE Workshop on Auto ID Advanced Technologies (AutoID) 2005

IR and Visible Face Recognition. Xin Chen, Patrick Flynn and Kevin Bowyer, Journal of Computer Vision and Image Understanding (CVIU) 2005

Multimodal Biometrics Using Facial Appearance, Shape, and Temperature. Kyong Chang, Kevin Bowyer, Patrick Flynn and Xin Chen, IEEE International Conference on Face and Gesture Recognition 2004

Evaluation of Multimodal Biometrics Using Appearance, Shape, & Temperature. Kyong Chang, Kevin Bowyer, Patrick Flynn and Xin Chen, Conference on Biometric Technology for Human Identification 2004

PCA-Based Face Recognition in Infrared Imagery: Baseline and Comparative Studies. Xin Chen, M.S. Thesis 2003

Visible-light and Infrared Face Recognition. Xin Chen, Patrick Flynn and Kevin Bowyer, Workshop on Multimodal User Authentication 2003

PCA-based Face Recognition in IR Imagery: Baseline and Comparative Studies. Xin Chen, Patrick Flynn and Kevin Bowyer, International Workshop on Analysis & Modeling of Faces and Gestures 2003