

TERENCE M. SIM



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**Research
Interests:**
(also see
Research
Statement)

Face processing: analysis, recognition, modeling, animation, rendering.
Biometrics. Pattern Recognition.
Computational Photography.
Computer vision. Image processing.

Education:

CARNEGIE MELLON UNIVERSITY Pittsburgh, PA
Ph.D. in Electrical and Computer Engineering, June, 2002. Advisor: Prof. Takeo Kanade, Director of Robotics Institute. Thesis: *Statistically-Optimal Image-based Rendering and its Application to Face Recognition*.

STANFORD UNIVERSITY Palo Alto, CA
Master of Science in Computer Science, Sept. 1991. Advisor: Prof. Gio Wiederhold. Project: *Penguin, an Object-Oriented front-end for relational databases* (Informix on UNIX & Ingres on VMS).

MASSACHUSETTS INSTITUTE OF TECHNOLOGY Cambridge, MA
Bachelor of Science in Computer Science and Engineering, Sept. 1990. Thesis: *An Enhanced Architecture for Composite Information Systems*, supervised by Prof. Stuart Madnick of MIT Sloan School of Management.

Employment:

NATIONAL UNIVERSITY OF SINGAPORE Singapore
July 2002 – present. Assistant Professor at the School of Computing. Supervised 12 post-graduate students, 2 post-doctoral fellow, 4 research assistants. Courses taught: CS1101/S Programming Methodology (Java, Scheme); CS1231 Discrete Structures; CS4243 Computer Vision & Pattern Recognition; CS5240 Theory and Practice of Multimedia; CS4340 Digital Special Effects.

Oct. 1996 – June 2002. Senior Tutor at the School of Computing. Tutored discrete mathematics course. Sponsored by NUS to pursue a Ph.D. at CMU.

PLATINUM TECHNOLOGY PTE. LTD. Singapore
Sept 1995 - Oct 1996. Technical Manager overseeing a team of pre-sales technical staff for Platinum's products in Systems Management, Database Management, Data Warehouse, Business Intelligence, Application Life Cycle. Management duties included staff training, planning of resources, infrastructure setup. Pre-sales duties included customer presentations, installation/ training of software.

DEVELOPMENT BANK OF SINGAPORE (DBS) Singapore
Sept. 1991 – Aug. 1995. Senior Systems Analyst in the bank's Data Resources department. Project Leader for a client/server, document imaging system on RS/6000 (X Windows, AIX, and MS Windows). System Administrator for AIX: performance monitoring and tuning of AIX server. Database Administrator for DB2 (on IBM mainframe) and Informix (on RS/6000 and HP 9000): performance optimization of application databases.

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	<p style="text-align: right;">Singapore</p> <p>DBS RECREATION CLUB MANAGEMENT COMMITTEE Aug. 1992 – Jul. 1993. Public Affairs Secretary in a committee of 13 people. Created and edited circulars to publicize sports/cultural/social activities to 5000 club members. Helped organize annual cross-country runs, Family Day '93 (in which attendance exceeded 8000 people).</p>
Consultancy:	<ul style="list-style-type: none"> • Hutcabb Consulting Pte. Ltd.: May 2012. • 121View Singapore: May 2009 – Feb 2011. • Ministry of Home Affairs, Singapore: June 2008 – Dec. 2008. • Stelop Private Limited, Singapore: Jan. 2008 – Jan. 2009. • Remarkable Innovation, Singapore: July 2007
Honors, Activities, Awards:	<ul style="list-style-type: none"> • NUS School of Computing Teaching Excellence, 2003 and 2005. • CMU Graduate Teaching Award, 2001. • NUS Overseas Scholarship for Doctorate studies 1997. • DBS Bank (Singapore) Overseas Scholarship for Undergraduate studies 1987 – 1991. • Member of Eta Kappa Nu (USA engineering honors society), 1989 – 1990. • Valedictorian at Raffles Junior College, won Chiam Tao Soon Engineering Trophy, 1984. • Ministry of Education Pre-University Scholarship 1983 – 1984.
Grants Received:	<ul style="list-style-type: none"> • NUS Faculty Research Council (FRC) grant: Sketch Me If You Can, \$105.7K, Mar. 2011 – Feb. 2013. • NUS FRC grant: Wonder Twins, \$73.9K, Sept. 2009 – Aug. 2010. • NUS FRC grant: Collaborative Computational Photography, \$102.068K, Apr. 2009 – Mar. 2012. • Temasek Young Investigator's Award by the Singapore Defence Science & Technology Agency: Tallyface Project, \$700K, Apr. 2006 – Mar. 2009. • Microsoft Research Asia award: Biometrics, USD\$15K, Apr. 2006 – Mar. 2007. • NUS FRC grant: Digicam Project, \$66.8K, Oct. 2005 – Sep. 2006. • NUS FRC grant: Face Project, \$91.7K, Mar. 2003 – Feb. 2005. • NUS FRC grant: Improving Photographs via Image-based Rendering, \$23K, Nov. 2002 – Apr. 2004. <p>Total grant amount = \$1.2M (~ USD960K)</p>
Patents:	<p>US Patent No. 12/779,219 dated 13 May 2010: Enhancing Photograph Visual Quality Using Texture And Contrast Data From Near Infra-Red Images (Pending)</p> <p>US Patent No. 61/357,450 dated 22 June 2010: Digital Face Makeup by Example (Pending)</p> <p>US Patent No. 61/353,812 dated 11 June 2010: General Motion-based Face Recognition (Pending)</p>

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	<p>US Patent No. 61/353,602 dated 10 June 2010: Correcting Over-exposure in Photographs (Pending)</p> <p>US Patent No. 61/353,815 dated 11 June 2020: Robust Flash Deblurring (Pending)</p> <p>Singapore Patent No. 200602272-7, dated 5 April 2006: Combining Image Rendering and Machine Learning to Improve the Robustness of Face Recognition (Lapsed)</p>
Students supervised:	<p><u>Current:</u> (6 Ph.D. students)</p> <ul style="list-style-type: none">• Hossein NEJATI, Topic: <i>Eyewitness Sketch and Recognition</i>• Vlad HOSU, Topic: <i>Computational Photography</i>• MA Keng Teck, Topic: <i>Gaze-based Profile Inferencing</i>• Hamed KIANI, Topic: <i>Eyewitness Sketch Recognition</i>• Lewis FOO, Topic: <i>Adaptive Biometrics</i>• ZHANG Li, Topic: <i>Digital Double</i> <p><u>Graduated:</u> (7 Ph.D., 8 Masters)</p> <ul style="list-style-type: none">• Shaojie ZHUO, Ph.D. 2013. Senior Engineer, Qualcomm, Toronto, Canada. Thesis: <i>Computational Low Light Photography</i>• Ruchi SRIVASTAVA, Ph.D. 2012. Research Engineer, Institute for Infocomm Research, Singapore. Thesis: <i>Beyond Traditional Emotion Recognition</i>.• Ning YE, Ph.D. 2010. Post-Doctoral Fellow, Bioinformatics Institute, Singapore. Thesis: <i>Motion-based Face Recognition</i>.• Dong GUO, Ph.D. 2010. Research Engineer, Facebook, Palo Alto, California, U.S.A. Thesis: <i>A Collection of Digital Photo Editing Methods</i>.• Bhaskar BHATTACHARYA, M.Comp. 2010. Ph.D. student, Iowa State Univ. Thesis: <i>Automatic Recommendation of Sunglasses Using Face Images</i>.• Han LU, M.Sc. 2010. IT Consultant at Misys Sophis, China. Thesis: <i>Separating Reflected Images using WFLD</i>.• Xiaopeng ZHANG, Ph.D. 2010. Senior Engineer, Qualcomm Inc., Toronto, Canada. Thesis: <i>Gradient Variation: a Key to Enhancing Photographs across Illumination</i>.• Helga MAZYAR, M.Sc. 2009. Ph.D. student, Univ. of Southern California. Thesis: <i>Facial Expression Animation based on Conversational Text</i>.• FENG Jimin, M.Sc. 2009. Software Engineer, Paypal, Singapore. Thesis: <i>Speeding Up Boosted Cascade of Object Detection Using Commodity Graphics Hardware</i>.• Jianran LI, M.Sc. 2009. Associate, Goldman Sachs, New York, NY, USA. Thesis: <i>Supervised Extraction of Face Subspaces based on Multimodal Discriminant Analysis</i>.

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- Xiaoping MIAO, Ph.D. 2008. Lecturer, Sun Yat Sen University, China. Thesis: *Ambient Image Recovery and Rendering from Flash Photographs*.
- Sheng ZHANG, Ph.D. 2007. Software Engineer, Amazon.com, Inc. Thesis: *Exploring Face Space: a Computational Approach*.
- Rajkumar JANAKIRAMAN, M.Comp. 2006. Software Developer, Microsoft, Redmond, WA, USA. Thesis: N.A.
- Xiaoyu HUANG, M.Sc. 2005. Research Manager, IDC Asia Pacific, Singapore. Thesis: *Stereo-based Human Detection and Tracking for Crowd Monitoring*.
- Jun YIN, M.Sc. 2005. Software Engineer, Microsoft, Redmond, WA, USA. Thesis: *Music Transcription using Instrument Model*.

Interns:

- Bahador Saket, Oct. 2011 – Apr. 2012, from Multimedia University, Malaysia
- Markus Brenner, Aug. – Nov. 2010, from Australian National University, Australia.
- Karim Krichane, Apr. – Oct. 2007, from Ecole Polytechnique Federale de Lausanne, Lausanne, Switzerland.
- Jonathan Blanc, Mar. – Sep. 2006, from Universite Paul Sabatier, Toulouse, France.
- Mounir Krichane, Apr. – Oct. 2005, from Ecole Polytechnique Federale de Lausanne, Lausanne, Switzerland.

Selected Publications: (full list available on request)

Towards General Motion-based Face Recognition

Ning Ye and Terence Sim. IEEE Conference on Computer Vision and Pattern Recognition, June 2010.

Robust Flash Deblurring

Shaojie Zhuo, Dong Guo and Terence Sim. IEEE Conference on Computer Vision and Pattern Recognition, June 2010.

Correcting Over-Exposure in Photographs

Dong Guo, Yuan Cheng, Shaojie Zhuo and Terence Sim
IEEE Conference on Computer Vision and Pattern Recognition, June 2010.

Privacy Issues

Terence Sim. Book chapter, Encyclopedia of Biometrics, Springer-Verlag, July 2009.

Smile, You're on Identity Camera

Ning Ye and Terence Sim. IAPR International Conference on Pattern Recognition, Dec. 2008.

Using Targeted Statistics for Face Regeneration

Dan Yu and Terence Sim. IEEE Conference on Automatic Face and Gesture Recognition, Sep. 2008.

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	<p><i>Enhancing Photographs Using Near Infrared Images</i> Xiaopeng Zhang, Terence Sim, and Xiaoping Miao. IEEE Conference on Computer Vision and Pattern Recognition, June 2008.</p> <p><i>Discriminant Subspace Analysis: A Fukunaga-Koontz Approach</i> Sheng Zhang and Terence Sim. IEEE Transactions on Pattern Analysis and Machine Intelligence, Vol. 29, No. 10, Oct. 2007, pp. 1732 – 1745.</p> <p><i>Continuous Verification Using Multimodal Biometrics</i> Terence Sim, Sheng Zhang, Rajkumar Janakiraman, and Sandeep Kumar. IEEE Transactions on Pattern Analysis and Machine Intelligence, Vol. 29, No. 4, Apr. 2007, pp. 687 – 700.</p> <p><i>The CMU Pose, Illumination, and Expression (PIE) Database.</i> Terence Sim, Simon Baker, and Maan Bsat. IEEE Transactions on Pattern Analysis and Machine Intelligence, Vol. 25, No. 12, December, 2003, pp. 1615 – 1618.</p> <p><i>A Characterization of Inherent Stereo Ambiguities.</i> Simon Baker, Terence Sim, and Takeo Kanade. 8th IEEE International Conference on Computer Vision, July, 2001.</p>
<p>Teaching: (also see Teaching Statement)</p>	<p><u>At NUS:</u></p> <p>Discrete Structures: AY2012/13 CS4340 Digital Special Effects: AY2010/11, AY2011/12, AY2012/13 CS5240 Theoretical Foundations in Multimedia: AY2002/03 – AY2005/06, AY2009/10, AY2010/11, AY2012/13 CS4243 Computer Vision & Pattern Recognition: AY2006/07 – AY2009/10 CS5245 Vision & Graphics for Special Effects: AY2006/07 CS1101S Programming Methodology (Scheme): AY2004/05, AY2005/06 CS1101 Programming Methodology (Java): AY2002/03, AY2003/04 CS105 Discrete Mathematics: AY1996/97</p> <p><u>At CMU:</u></p> <p>18-794 Pattern Recognition Theory, 2001 18-752 Estimation, Detection and Identification, 2000 15-211 Fundamental Data Structures and Algorithms, 1999</p>
<p>Reviewer / Program Committee:</p>	<p><u>Service as reviewer for conferences:</u></p> <p>Asian Conference on Computer Vision (ACCV) 2006 IEEE Workshop on Applications of Computer Vision (WACV) 2008, 2011 IEEE Conference on Computer Vision and Pattern Recognition (CVPR) 2009, 2010, 2011 IAPR International Conference on Pattern Recognition (ICPR) 2010, 2012 International Conference on Control, Automation, Robotics and Vision (ICARCV) 2010 IEEE International Conference on Computer Vision (ICCV) 2009</p> <p><u>Service as reviewer for Journals:</u></p> <p>IEEE Transactions on Pattern Analysis and Machine Intelligence</p>

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	<p>Pattern Recognition Letters IEEE Transactions on Systems, Man and Cybernetics IEEE Transactions on Mobile Computing IEEE Transactions in Image Processing IEEE Transactions on Information Forensics and Security IEEE Transactions on Neural Networks International Journal of Biometrics Information Processing Society of Japan Transactions on Computer Vision and Applications</p> <p><u>Program Committee:</u></p> <p>Track Chair: IAPR International Conference on Pattern Recognition 2014 Session Chair: IAPR International Conference on Pattern Recognition 2012 Publicity chair: IEEE International Conference on Face and Gesture Recognition (FG) 2011 IAPR Conference on Machine and Vision Applications 2011 International Workshop on Subspace Methods 2009, 2010 Workshop/tutorial chair: Pacific Symposium on Image and Video Technologies (PSIVT) 2010 Tutorial chair: Asian Conference on Computer Vision 2010 International Conference on Affective Computing & Intelligent Interaction 2009 Associate editor: IEEE/ASME International Conference on Advanced Intelligent Mechatronics 2009 Local Chair: Asian Biometrics Consortium Conference, Sep. 2007. Poster and Demo Chair: International Conference on Image and Video Retrieval (CIVR) 2005. Local co-Chair: ACM Multimedia Conference 2005.</p> <p><u>Service as reviewer for Grant Agencies:</u></p> <p>Kentucky Science & Engineering Foundation: 2005 Hong Kong Research Grants Council: 2005, 2007, 2008, 2009, 2010 Singapore-Israel Industrial Research and Development Foundation: 2005, 2006</p> <p><u>External examiner:</u></p> <p>Ph.D. thesis of Junbin Liu, "Distributed Low-power Image Processing in Wireless Sensor Networks for Intelligent Video Surveillance Applications", June 2012. Principal Supervisor: Professor Sridha Sridharan, Science and Engineering Faculty, Queensland University of Technology, Australia.</p> <p>Ph.D. thesis of Ligang Zhang, "Towards Spontaneous Facial Expressions Recognition in Real World Video", Jan. 2012. Principal Supervisor: Professor Dian Tjondronegoro, Science and Engineering Faculty, Queensland University of Technology, Australia.</p> <p>Ph.D. thesis of Ronald Tabu Elunai, "Particulate texture analysis with applications", Oct. 2010. Principal Supervisor: Professor Vinod Chandran, School of Engineering Systems, Queensland University of Technology, Australia.</p>
Appointments:	<p>Vice President, PREMIA (Singapore Pattern Analysis and Machine Intelligence society): Aug. 2010 – present Board Member, PREMIA: Aug. 2008 – Aug. 2010. Protem Treasurer, PREMIA: Jan. – Aug. 2004. Vice-Chairman of the Singapore Biometrics Technical Committee (BTC): 2010 – present.</p>

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	<p>Chairman, Working Group on Cross-Jurisdictional and Societal Aspects, BTC: 2006 -- 2010. Judge in the Singapore Science and Engineering Fair: 2007, 2010. Judge in MOE SMP fair, Sep. 2008. Judge in Tan Kah Kee Young Inventor's Award: 2009, 2010.</p>
Invited Talks:	<ul style="list-style-type: none"> • Invited speaker at the Asian Biometrics Consortium Conference and Exhibition, Dec. 2010, organized by the Universiti Teknologi Malaysia (UTM), www.abc-2010.com. Title: "Rethinking Eyewitness Sketches for Criminal Identification" • Invited speaker at the Biometrics Institute Annual Australian Conference, May 2010, www.biometricsinstitute.org. Title: "Motion-based Face Recognition" • Invited speaker at the HIDE (Homeland Security, Biometric Identification & Personal Detection Ethics) Project Workshop (www.hideproject.org/events/workshops.html), promoted by the European Commission, 2009. Title: "Privacy and Biometric Technologies" • Invited speaker at Governmentware 2008 (organized by the Singapore Ministry of Home Affairs, www.govware.sg). Title: "Continuous Authentication using Multimodal Biometrics" • Invited instructor for the Biometrics Short Course, organized by PREMIA, May 2007, www.premia-sg.org. • Invited panelist speaker at the Global Security Challenge in Singapore, Sept. 2007. • Invited speaker at the Biometrics Institute Annual Australian Conference, June 2007, www.biometricsinstitute.org. Title: "Status of Biometrics in Singapore" • Invited speaker at Governmentware 2007 (organized by the Singapore Ministry of Home Affairs, www.govware.sg). Title: "Biometrics Deployment – Increasing User Acceptance" • Invited speaker at Governmentware 2006 (organized by the Singapore Ministry of Home Affairs, www.govware.sg). Title: "Societal Aspects of Biometrics" • Invited instructor for the Digital Image Processing Short Course, organized by PREMIA, July 2006, www.premia-sg.org. • Invited speaker at the Biometrics Forum, Sept. 2005, at the Global Entrepolis @ Singapore (jointly presented by the Economic Development Board and the Singapore Business Federation, www.globalentrepolis.com). Title: "Biometrics in Society: Secure Sentry or Big Brother?"
Skills:	<p>Python, Matlab, Java, C, C++, Scheme, Common Lisp, basic Unix system administration, Unix shell scripting.</p>
Languages:	<p>English: (first language) fluent in speaking, reading, writing. Chinese Mandarin: fluent in speaking, reading. Chinese Cantonese, Hokkien, Teochew: fluent in speaking. Japanese: basic understanding.</p>
Hobbies:	<p>Reading; Word games; Playing keyboard, guitar; Running</p>