

# Chi Nhan Duong

---

## CONTACT INFORMATION

CyLab Biometrics Center  
Carnegie Mellon University  
Mobile: +1-412-620-3444  
E-mail: [chinhand@andrew.cmu.edu](mailto:chinhand@andrew.cmu.edu)  
Homepage: [http://users.encs.concordia.ca/~c\\_duong/](http://users.encs.concordia.ca/~c_duong/)

## RESEARCH INTERESTS

Deep learning, Sparse Representation, Computer Vision, Machine Learning, Digital Image Processing.

### Specific topics:

- Deep Generative Models for Face Modeling.
- Deep Learning Models for Face Recognition.
- Face Aging (Age Estimation, Age Progression).
- Image denoising, inpainting and super-resolution.

## EDUCATION

**Ph.D. in Computer Science, Concordia University, Canada** 2013 - 2018  
Department of Computer Science & Software Engineering

- Thesis Title: *Beyond PCA: Deep Learning Approaches for Face Modeling and Aging*
- Supervisors: *Professor Tien D. Bui and Dr. Khoa Luu (Carnegie Mellon University)*
- Courses taken: Advanced Image Processing, Pattern Recognition, Large Scale Optimization.
- GPA: 4.3/ 4.3
- Area of Study: Computer Vision, Machine Learning, Compressed Sensing, Optimization, Deep Learning, Digital Image Processing.

**Master in Computer Science, University of Science, Vietnam** 2008 - 2010  
Faculty of Information Technology

- Thesis Title: *Fine tuning age-estimation with global and local facial features*
- Supervisors: *Professor Hoai Bac Le and Dr. Khoa Luu (Carnegie Mellon University)*
- Thesis grade: 9.2/10
- Area of Study: Computer Vision, Machine Learning, Optimization.

**B.S. in Computer Science, University of Science, Vietnam** 2004 - 2008  
Faculty of Information Technology

### Honor Program

- Thesis Title: *Watermarking techniques for video copyright protection*
- Supervisor: *Professor Hoai Bac Le*
- Thesis grade: 9.1/10
- Rank: Excellent
- Area of Study: Digital Image Processing.

## JOURNAL PUBLICATIONS

- [1] **Chi Nhan Duong**, Kha Gia Quach, Khoa Luu, T. Hoang Ngan Le, Marios Savvides, Tien D. Bui, “**Learning from Longitudinal Face Demonstration - Where Tractable Deep Modeling Meets Inverse Reinforcement Learning**”, *International Journal of Computer Vision (IJCV)*, 2018. (Under review - 2nd round) [Link](#) (**Impact factor: 11.541**)
- [2] **Chi Nhan Duong**, Khoa Luu, Kha Gia Quach, Tien D. Bui, “**Deep Appearance Models: A Deep Boltzmann Machine Approach for Face Modeling**”, *International Journal of Computer Vision (IJCV)*, 2016. (Accepted) [Link](#) (**Impact factor: 11.541**)
- [3] T. Hoang Ngan Le, **Chi Nhan Duong**, Ligong Han, Khoa Luu, Kha Gia Quach, Marios Savvides, “**Deep Contextual Recurrent Residual Networks for Scene Labeling**”, *Pattern Recognition*, 2018. [Link](#) (**Impact factor: 4.582**)

CONFERENCE  
PUBLICATIONS

- [4] Kha Gia Quach, **Chi Nhan Duong**, Khoa Luu, Tien D. Bui. “**Non-convex Online Robust PCA: Enhance Sparsity via  $\ell_p$ -norm Minimization**”. *Computer Vision and Image Understanding (CVIU)*, 2017. [Link](#) (*Impact factor: 2.498*)
- [5] T. Hoang Ngan Le, Kha Gia Quach, Khoa Luu, **Chi Nhan Duong**, Marios Savvides. “**Reformulating Level Sets as Deep Recurrent Neural Network Approach to Semantic Segmentation**”. *IEEE Transactions on Image Processing (TIP)*, 2018. [Link](#) (*Impact factor: 4.828*)
- [6] **Chi Nhan Duong**, Khoa Luu, Kha Gia Quach, Tien D. Bui, “**Longitudinal Face Aging in the Wild-Recent Deep Learning Approaches**”, *Computer and Robot Vision (CRV)*, Canada, 2018. (Accepted) [Link](#)
- [7] **Chi Nhan Duong**, Kha Gia Quach, Khoa Luu, T. Hoang Ngan Le, Marios Savvides, “**Temporal Non-Volume Preserving Approach to Facial Age-Progression and Age-Invariant Face Recognition**”, *The IEEE International Conference on Computer Vision (ICCV)*, Italy, 2017.(ORAL) (Acceptance rate 2.09%) [Link](#)
- [8] T. Hoang Ngan Le, Kha Gia Quach, ChenChen Zhu, **Chi Nhan Duong**, Khoa Luu, Marios Savvides, “**Robust Hand Detection and Classification in Vehicles and in the Wild**”, *The IEEE International Conference on Computer Vision and Pattern Recognition Workshop (CVPRW)*, Hawaii, 2017. [Link](#)
- [9] **Chi Nhan Duong**, Khoa Luu, Kha Gia Quach, Tien D. Bui, “**Longitudinal Face Modeling via Temporal Deep Restricted Boltzmann Machines**”, *The IEEE International Conference on Computer Vision and Pattern Recognition (CVPR)*, Las Vegas, 2016. (Acceptance rate 29.9%) [Link](#)
- [10] Kha Gia Quach\*, **Chi Nhan Duong\***, Khoa Luu, Tien D. Bui, “**Robust Deep Appearance Models**”, *The 23rd International Conference on Pattern Recognition (ICPR)*, Cancun, 2016. (\*equal contribution) [Link](#)
- [11] Kha Gia Quach, **Chi Nhan Duong**, Khoa Luu, Tien D. Bui, “**Depth-based 3D Hand Pose Tracking**”, *The 23rd International Conference on Pattern Recognition (ICPR)*, Cancun, 2016. [Link](#)
- [12] **Chi Nhan Duong**, Khoa Luu, Kha Gia Quach, Tien D. Bui, “**Beyond Principal Components: Deep Boltzmann Machines for Face Modeling**”, *The IEEE International Conference on Computer Vision and Pattern Recognition (CVPR)*, Boston, 2015. (Acceptance rate 28.4%) [Link](#)
- [13] Kha Gia Quach, Khoa Luu, **Chi Nhan Duong**, Tien D. Bui. **Robust  $\ell_p$ -norm Singular Value Decomposition**. *NIPS Workshop on Non-convex Optimization for Machine Learning: Theory and Practice (NIPSW)*, December 2015. [Link](#)
- [14] **Chi Nhan Duong**, Kha Gia Quach, Tien D. Bui, “**Are Sparse Representation and Dictionary Learning Good for Handwritten Character Recognition?**”, *The 14th International Conference on Frontiers in Handwriting Recognition (ICFHR)*, Crete, Greece, 2014. (ORAL Acceptance rate 20.8%) [Link](#)
- [15] Kha Gia Quach, **Chi Nhan Duong**, Tien D. Bui, “**Sparse representation and Low-rank approximation for Robust Face Recognition**”, *The 22nd International Conference on Pattern Recognition (ICPR)*, Stockholm, Sweden, 2014. [Link](#)
- [16] **Chi Nhan Duong**, Pham Dinh Thang Cap, Thanh Duc Ngo , Duy-Dinh Le, Hoai Bac Le, Duc Anh Duong, Shin’ichi Satoh, “**Robust Eye Localization in Video By Combining Eye Detector and Eye Tracker**”, *The 21st International Conference on Pattern Recognition (ICPR)*, Tsukuba, Japan, Nov 2012. (Acceptance rate 48.53%) [Link](#)

- [17] Kha Gia Quach, **Chi Nhan Duong**, Khoa Luu and Hoai Bac Le, “**Gabor Wavelet-Based Appearance Models**”, *The 9th IEEE-RIVF Intl. Conf. on Computing and Communication Tech. (RIVF)*, Vietnam, 2012. (ORAL Acceptance rate 28%) [Link](#)
- [18] **Chi Nhan Duong**, Kha Gia Quach, Khoa Luu, Hoai Bac Le, Karl Ricanek, “**Fine tuning age-estimation with global and local facial features**”, *The 36th International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, 2032 - 2035, 2011. (Acceptance rate 49%) [Link](#)

## TEACHING EXPERIENCE

**Teaching Assistant** Sep 2014 - 2016  
**Concordia University, Canada**  
*Computer Lab Instructor and Tutor: Image Processing (COMP6771).*

**Lecturer** Jan 2011 - Dec 2012  
**University of Science, Vietnam**  
*Instructor for advanced Computer Science course: Data Hiding and Secret Sharing.*  
*Computer Lab Instructor: Computer Graphics, Data Structures and Algorithms, Artificial Intelligence.*

**Teaching Assistant** 2009 - Dec 2010  
**University of Science, Vietnam**  
*Computer Lab Instructor: Data Hiding and Secret Sharing, Computer Graphics, Data Structures and Algorithms, Artificial Intelligence.*

## PROFESSIONAL EXPERIENCE

**CyLab Biometrics Center, Carnegie Mellon University, USA**  
*Research Associate* Sep 2016 - present

- *Deep Learning Models for Face Matching*
- *Soft biometrics with age and gender estimation*
- *Tractable Deep Generative Models for Longitudinal Face Modeling*
- *Generative Adversarial Networks for Face Modeling*
- *Deep Learning Models for Scene Parsing*

**Concordia University, Canada**  
*Research Assistant* Jan 2013 - 2016

- *Deep Generative Model for Longitudinal Face Modeling*
- *Deep Boltzmann Machines for Face Modeling*: proposed a novel Deep Appearance Models (DAMs) approach to accurately capture both shape and texture of face images under large variations. This model can be used as an efficient replacement for Active Appearance Models (AAMs).
- *Low rank matrix factorization, Compressed sensing, Sparse representation and dictionary learning*: evaluating the sparse representation based system for face recognition with occlusions.
- *Handwritten character recognition*: applied the theories of sparse representation and dictionary learning to handwritten character recognition.

**National Institute of Informatics, Tokyo Japan**  
*Research Intern* Feb 2012 - Aug 2012

- *Eye Localization in Video*: proposed to combine both tracker and detector for robust eye localization in video. The new system can overcome challenging factors such as: extreme head pose change, closed eyes and occlusion.
- *Video Aesthetic Assessment*: proposed a system to automatically extract the beautiful scene in broadcast videos. Four scene-level features for scene aesthetic assessment including (1) length of scene, (2) scene difference, (3) overall picture of scene and (4) object interestingness are designed. These four features will fully exploit the temporal information and provide a better understanding of human impression from scene.

- *Face recognition.*

**FPT Software, Ho Chi Minh City, Vietnam**

*Software and Web Design Engineer Intern*

**Jun 2007 - Aug 2007**

- Designed and developed a web-based translated document mangement system.

**University of Science, Vietnam**

*Research Assistant*

**Sep 2009 - Feb 2012**

- *Facial Age Estimation:* proposed an advanced age-estimation approach that combines global and local features derived from a facial image.
- *Digital Image Tampering Detection using Color Filter Array.*

*Undergraduate Student*

**Sep 2004 - Aug 2008**

- *Video Watermarking:* applied DCT and DWT techniques to embed copyright information to video and proposed a new method that combines these techniques to improve the scheme's robustness.
- A project in Handwritten characters recognition using Feed-Forward Neural Network.
- A course project in Image Processing: develop Traffic Sign Detection with four kinds of sign: circle, triangle, rectangle and square.

**PROJECT  
EXPERIENCE**

**CyLab Biometrics Center, Carnegie Mellon University, USA**

- *Face Matching SDK*
- *Face Analysis SDK for age and gender estimation*
- *Long range face matching*

**Vietnam National University, Vietnam**

- *Efficient Face Retrieval In Large Scale Video Archives (2012 - 2013)*

**HONORS AND  
AWARDS**

**Concordia University, Canada**

- Concordia Accelerator Award, 2017
- Concordia University Conference and Exposition Award, 2017
- Centre for Pattern Recognition and Machine Intelligence Graduate Scholarship, 2016.
- Centre for Pattern Recognition and Machine Intelligence Graduate Scholarship, 2014.
- Concordia University full tuition recruitment award, (2013 - 2015).

**Odon Vallet scholarship (2003).**

**SKILLS**

**Programming:** MFC/ WinAPI, C/C++, C#, R, Python, Java, SQL, MySQL.

**Libraries:** DeepNet, OpenCV, OpenGL.

**Deep Learning frameworks:** Caffe, Tensorflow, Mxnet, Pytorch

**Tools:** Matlab, Microsoft Visual Studio, IPython.

**Operating Systems:** Linux, Microsoft Windows, Apple OS X.

**Languages:** Fluency in English, and Vietnamese. Intermediate French.

**Soft skills:**

- Teamwork, self-study ability, motivated.
- Problem-solving and analytical skills.
- Patience and hard working.

**ACADEMIC  
SERVICES**

*Conference Reviewer*

International Conference on Document Analysis and Recognition (ICDAR), 2015

*Journal Reviewer*

Signal Processing, Signal Processing Letters.

Pattern Recognition, Pattern Recognition Letters.

Transactions on Image Processing.  
Transactions on Pattern Analysis and Machine Intelligence.

<b>VOLUNTEERING ACTIVITIES</b>	John Molson MBA International Case Competition, Canada	Jan 2014
	<ul style="list-style-type: none"><li>• Role: Welcome team, and Judge coordinator.</li><li>• Guide the judges to the appropriate presentation rooms, introduce the judges, explain the competition rules and keep track of time of the competing team's presentation.</li></ul>	
	Woman Center, Montréal, Canada	Dec 2013
	<ul style="list-style-type: none"><li>• Help them sorting and packing donations that was used in Christmas.</li></ul>	
<b>REFERENCES</b>	Available upon request	