

# Anh Phong Tran

PHD CANDIDATE · CHEMICAL ENGINEERING

✉ anhphong.t@gmail.com | 🏠 www.phongatran.com | 📧 phongatran | 🌐 phongatran

## Education

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### Northeastern University

Ph.D. Candidate in Chemical Engineering (Advisor: Dr. Eduardo Sontag)

Boston, MA

Sept. 2014 - Aug. 2020 (Anticipated)

### Northeastern University

M.S. in Electrical and Computer Engineering (Concentration in Communications, Control, and Signal Processing)

Boston, MA

Anticipated Graduation: May 2020

### Tufts University

B.S. in Chemical and Biological Engineering, Magna Cum Laude

Medford, MA

Graduated May. 2013

## Work Experience

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### Northeastern University

RESEARCH ASSISTANT, ADVISOR: DR. EDUARDO SONTAG

Boston, MA

Sept. 2018 - Present

- Optimal control and dose planning in chemotherapy treatments
- Mathematical modeling of drug resistance in cancer treatment
- Prediction of multi-drug combinations efficacy

RESEARCH ASSISTANT, ADVISOR: DR. QIANQIAN FANG

May. 2016 - Aug. 2018

- Developed a new 3D mesh generation workflow for the human head (Brain2mesh).
- Algorithm improvement of the radiative transport equation for photon propagation (MMC/MCX).
- Dosimetry of near-infrared light using transcranial and intranasal shedding for the treatment of major depressive disorders
- Porting of the mesh-based Monte Carlo to use graphics processing units

TEACHING ASSISTANT

Jan. 2015 - May. 2016

- CHME 4512: Chemical Engineering Process Control
- CHME 3313: Transport Processes 2 and Separations

### Tufts University

RESEARCHER IN CHEMICAL PROCESS CONTROL, ADVISOR: DR. CHRISTOS GEORGAKIS

Medford, MA

Jan. 2014 - Aug. 2014

- Developed a new approach to create high-dimensional steady-state surrogate/approximate models of industrial plant-wide processes.
- Application of D-optimal designs to reduce considerably calculation costs and net-elastic regularization techniques to avoid overfitting issues.
- Demonstrated the applicability of these surrogate models to study difficult operability problems such as the snow-ball effects in processes with recycle streams, operating cost optimization in high-dimensional spaces, plant-wide heat integration, and control of the product quality.

RESEARCHER IN TRANSPORT PHENOMENA, ADVISOR: DR. JERRY H. MELDON

Jan. 2014 - Aug. 2014

- Solved transient permeation and heat conduction problems in layered composite materials with external transfer resistance.
- Application of Separation of Variables and Laplace transform techniques to solve partial differential equations.
- Proved the ability to accurately calculate mass permeation by combining the lead terms of "short-time" and "long-time" solutions.

## Languages and Skills

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### Programming Languages

C++, MATLAB, Python, LaTeX, OpenMP, OpenACC & CUDA

### Research interests

- Mathematical modeling in systems biology, cancer resistance, chemotherapy, immunology, multi-drug combinations
- Transport phenomena, analysis of chemical processes, reaction kinetics, thermodynamics, optimal control, nonlinear control
- Numerical methods, machine learning, data-driven modeling, optimization techniques, solving ordinary/partial differential equations, finite difference & finite element methods
- High-performance computing, Monte Carlo simulations, stochastic processes, functional near-infrared spectroscopy, photobiomodulation, mesh generation.

### Languages

French (Native), Vietnamese (Bilingual Proficiency) & Dutch (Limited Working Proficiency)

## Peer-Reviewed Publications

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- 1. TRANSIENT CONDUCTION AND PERMEATION IN LAYERED COMPOSITES WITH EXTERNAL TRANSPORT RESISTANCE**  
**AP Tran**, KA Smith & JH Meldon  
*Chem. Eng. Sci.*  
*In writing*
- 2. FAST AND HIGH-QUALITY BRAIN AND FULL-HEAD TETRAHEDRAL MESH GENERATION FOR MODEL-BASED BRAIN IMAGING**  
**AP Tran**, S Yan & Q Fang  
*arXiv:1708.08954*  
*Submitted (Neurophotonics)*
- 3. SELECTIVE PHOTOBIMODULATION FOR EMOTION REGULATION: MODEL-BASED DOSIMETRY STUDY**  
**AP Tran\***, P Cassano\*, H Katnani, B Bleier, M Hamblin, Y Yuan & Q Fang  
*Neurophotonics*  
*Feb 2019*
- 4. DUAL-GRID MESH-BASED MONTE CARLO ALGORITHM FOR EFFICIENT PHOTON TRANSPORT SIMULATIONS IN COMPLEX 3D MEDIA**  
S. Yan, **AP Tran** & Q Fang  
*JBO Letters*  
*Feb 2019*
- 5. ON THE ESTIMATION OF HIGH-DIMENSIONAL SURROGATE MODELS OF STEADY-STATE PLANT-WIDE PROCESSES CHARACTERISTICS**  
**AP Tran** & C Georgakis  
*Comput. Chem. Eng.*  
*March 2018*

## Conference Presentations & White Papers

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- 1. MOBILE PHONE CAMERA-BASED SPO<sub>2</sub> MEASUREMENTS USING BROADBAND LIGHT AND COLORED PAPER FILTERS**  
M Vanegas, **AP Tran**, E Laistler, & Q Fang  
*SPIE Photonics West*  
*2019*
- 2. GENERATING HIGH-QUALITY TETRAHEDRAL MESHES OF THE HUMAN HEAD AND APPLICATIONS IN FNIRS**  
**AP Tran** & Q Fang  
*OSA BCBO*  
*2018*
- 3. A DUAL-MESH MONTE CARLO ALGORITHM USING A COARSE TETRAHEDRAL MESH AND VOXEL OUTPUT**  
S Yan, **AP Tran** & Q Fang  
*OSA BCBO*  
*2018*
- 4. DEVELOPING AN ANATOMICALLY ACCURATE MULTI-LAYERED OPTICAL BRAIN PHANTOM FOR FNIRS STUDIES**  
S Sahin, X Sun, M Vanegas, **AP Tran** & Q Fang  
*OSA BCBO*  
*2018*
- 5. GENERATION OF HIGH-QUALITY TETRAHEDRAL HEAD MESH MODELS FROM MRI SCANS**  
**AP Tran** & Q Fang  
*NEBEC*  
*2017*
- 6. ELECTRODEPOSITION OF NI-FE-MO-W ALLOYS – 11TH-12TH QUARTER REPORT**  
**AP Tran** & EJ Podlaha-Murphy  
*Product Finishing*  
*2015*
- 7. ANALYSIS OF TRANSIENT PERMEATION AND CONDUCTION IN COMPOSITES WITH EXTERNAL MASS TRANSPORT RESISTANCE**  
JH Meldon & **AP Tran**  
*AIChE & NAMS*  
*2015*
- 8. FACILE ANALYSIS OF TRANSIENT DIFFUSION AND HEAT CONDUCTION**  
JH Meldon & **AP Tran**  
*AIChE*  
*2014*

## Honors & Awards

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- 2014 **Northeastern University**, Distinguished Dean's Fellowship *Boston, MA*  
2011 **Bunker Hill Community College**, Academic Excellence Award *Charlestown, MA*