

Babak Ehteshami Bejnordi

Research Scientist • Team Lead • Manager

 ehteshami@babakint.com

 [LinkedIn](#)

 [babakint.com](#)

 [Google Scholar](#)

 Amsterdam, The Netherlands


PROFESSIONAL EXPERIENCE

QUALCOMM AI RESEARCH

 Amsterdam, The Netherlands

- Leading a team on Conditional Computation for Efficient Deep Learning.

Team Lead, Staff Engineer, and Manager


 Nov 2019 – Present

QUALCOMM AI RESEARCH

 Amsterdam, The Netherlands

- Deep Learning Research Scientist

Senior Engineer


 Apr 2018 – Nov 2019

MAPSCAPE B.V.

 Eindhoven, The Netherlands

- Deep Learning and Computer Vision for Autonomous Driving

Deep Learning Engineer

 Oct 2017 – Mar 2018

EDUCATION


PH.D. IN MACHINE LEARNING & MEDICAL IMAGE ANALYSIS

Radboud University Medical Center, Nijmegen, The Netherlands

 Apr 2013 – Jun 2017

VISITING SCHOLAR

Harvard University, Boston, Massachusetts, USA

 Jun 2016 – Nov 2016

M.SC. IN ELECTRICAL ENGINEERING

Chalmers University of Technology, Goteborg, Sweden

 May 2010 – Dec 2012

B.SC. IN ELECTRICAL ENGINEERING

University of Guilan, Rasht, Guilan, Iran

 2004 – 2008


SELECTED PROJECTS

QUALCOMM AI RESEARCH

 Amsterdam, The Netherlands

- Multi-task learning networks for autonomous driving and virtual reality
- Conditional Compute for On-device Video Understanding at [NeurIPS Expo Demonstrations](#)
- Revisiting single-gated Mixtures of Experts published at [BMVC2022](#).

Conditional computation for Efficient Multi-Task Learning (Team Lead)

 Jan 2022 - Present

QUALCOMM AI RESEARCH

 Amsterdam, The Netherlands

- SALISA: Saliency-Based Input Sampling for Efficient Video Object Detection published at [ECCV2022](#).
- FrameExit: Conditional early exiting for efficient video recognition published at [CVPR2021 \(Oral paper\)](#).
- Skip-convolutions for efficient video processing published at [CVPR2021](#).

Efficient Deep Models for Video Processing

 Oct 2020 - Dec 2021

QUALCOMM AI RESEARCH

 Amsterdam, The Netherlands

- Conditional Channel Gated Networks for Task-Aware Continual Learning published at [CVPR2020 \(Oral paper\)](#).
- Batch-shaping for learning conditional channel gated networks published at [ICLR2020](#).

Conditional Computation for Convolutional Neural Networks

 May 2018 - Oct 2020

HARVARD UNIVERSITY

Deep learning for Diagnosing Breast Cancer Patients

📍 Boston, MA, USA

📅 May 2016 - Dec 2016

- Development of a deep learning system for diagnosing breast cancer patients (see publications [2017a](#) and [2017b](#)).
- This work was in Collaboration with NIH, and Mayo Clinic.
- Developed cascade of deep learning models that enables prediction of future invasive breast cancer occurrence among patients which are potentially at high risk of developing breast cancer.

RADBOUD UNIVERSITY

Lead organizer of CAMELYON16 Machine Learning Challenge

📍 Nijmegen, The Netherlands

📅 May 2016 - Dec 2016

- The challenge gathered participants from all around the world including Google, Harvard, MIT, etc.
- Performed thorough analysis of Deep Learning algorithms and comparison to expert pathologists.
- Publication at [JAMA with 2000+ citations](#).
- Extensive coverage in over 30 well-known websites and media (e.g. Yahoo News, NOS.nl).
- Highlighted in the [White House AI strategic planning report \(page 17\)](#).

RADBOUD UNIVERSITY


Machine learning for Breast Cancer Diagnosis


📍 Nijmegen, The Netherlands


📅 Apr 2013 - Mar 2016


- Co-authored "A survey on deep learning in medical image analysis" published at [MEDIA with ~10,000 citations](#).
- Development of context-aware stacked convolutional neural networks to efficiently improve the inclusion of more image context for Whole-slide Image processing published at [Journal of Medical Imaging](#).
- Development of an ML model based on graph theory-based clustering for the detection of pre-invasive cancer (DCIS) in giga-pixel pathology images published at [IEEE Transactions in Medical Imaging](#).
- Development of the first Whole-slide image color standardization published at [IEEE Transactions in Medical Imaging](#).
 - The first algorithm to standardize giga-pixel pathology images ([Source code](#), [Executable](#)).
 - Garnered lots of interest among companies and academic institutions and is widely being used by many researchers.
 - Using my algorithm, the team from Harvard & MIT improved its rank from 4th to 1st in CAMELYON16 challenge.


HONORS AND AWARDS


-  **Third highest cited (2000+) work in JAMA** 📅 2020
In 2020, with 2000+ citations, my paper on "Diagnostic assessment of deep learning algorithms lymph node metastases detection" was among the top 3 most cited works of the Journal of American Medical Association (Impact Factor 157) over the past 3 years.

-  **Highest cited survey on Deep Learning for Medical Imagin (~10,000 citations)** 📅 2017
Contributed (third author) to the highest cited survey in deep learning medical imaging to date.

-  **Finalist nomination for Wetenschaps- en Innovatieprijs 2019** 📅 2019
Finalist nomination for the [Wetenschaps- en Innovatieprijs 2019](#) of the Federation of Medical Specialists in the Netherlands for my project on artificial intelligence in breast cancer diagnosis.

-  **MedicalPhit Innovation Award of 2016** 📅 2016
Won the best [MedicalPhit Innovation Award of 2016](#) in the Netherlands for the study of the use of artificial intelligence in detecting metastases in breast cancer patients.

-  **Awarded research grants** 📅 2016
Awarded research grants from BeckLab, Harvard Medical School (2016), Radboud university (2016), Chalmers and Uppsala Universities (2012)

-  **Master's degree with honors** 📅 2013
GPA 5.0/5.0 at Chalmers University of Technology.

INTERESTS

Conditional Computation for Deep Neural Networks, Multi-task Learning, Continual Learning, Efficient Deep Learning and Sparsity, Autonomous Driving, and Medical Imaging.

SKILLS

Programming languages

- Python
- C/C++
- R
- Matlab

Libraries

- Deep Learning: Pytorch, Tensorflow, Theano
- Computer Vision: OpenCV, scikit-image, scikit-learn

Languages

- English (fluent)
- Persian (native)
- Dutch, Swedish, Italian (basic)

PUBLICATIONS

The full list of my peer-reviewed publications can be found on my [google scholar](#) page.

INVITED TALKS

- **DeepLearn 2023 Spring:** [Course lectures](#) on Conditional Computation for Efficient Deep Learning at the 9th International School on Deep Learning in Bari, Italy.

- **ELLIS PhD and Postdoc Summit,** [Keynote talk](#) at the ELLIS PhD and Postdoc Summit (kick-off program), 2021.

- **TWIML AI:** Podcast interview with Sam Charrington from [TWIML AI](#) on Conditional Computation.

- **Broad Institute of MIT and Harvard,** "Practical recommendations for training convolutional neural networks", MIA Seminar: Modeling, Inference, algorithms, 2017, USA, ([Youtube link](#)).

- **Dutch Society for Pattern Recognition and Image Processing,** "Automatic detection of ductal carcinoma in situ in whole slide histopathological images", Eindhoven, The Netherlands, 2015.

- **European Congress on Digital Pathology,** "An algorithm for reducing stain variability in scanned histological slides", Paris, France, 2014.

OTHER ACADEMIC/INDUSTRY EXPERIENCES

- **Qualcomm Innovation Fellowship:** Co-lead in the organization of the [Qualcomm Innovation Fellowship \(QIF\)](#) program in Europe from 2019 to 2023.

- **Deep learning workshop lecturer:** Co-organizer and lecturer at deep learning workshop at Radboud University, the Netherlands (2016).

- **Member of Broad Institute of MIT and Harvard,** Boston, Massachusetts, USA (Jul 2016 – Jul 2017).

- **Supervision and teaching experience:** Supervised more than ~10 master students of computer science and artificial intelligence for their course/master thesis project. Supervised 5 Ph.D. students for their internship/Qualcomm fellowship projects. I was also a teaching assistant for the course "Computer Aided Diagnosis" at Radboud University between 2013 and 2016.