**[Graph Transformer](https://openreview.net/forum?id=HJei-2RcK7)**

[Yuan Li](https://openreview.net/profile?email=liyuanchristy%40gmail.com), [Xiaodan Liang](https://openreview.net/profile?email=xiaodan1%40cs.cmu.edu), [Zhiting Hu](https://openreview.net/profile?email=zhitingh%40cs.cmu.edu), [Yinbo Chen](https://openreview.net/profile?email=cyb15%40mails.tsinghua.edu.cn), [Eric P. Xing](https://openreview.net/profile?email=epxing%40cs.cmu.edu)

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* **Abstract:** Graph neural networks (GNN) have gained increasing research interests as a mean to the challenging goal of robust and universal graph learning. Previous GNNs have assumed single pre-fixed graph structure and permitted only local context encoding. This paper proposes a novel Graph Transformer (GTR) architecture that captures long-range dependency with global attention, and enables dynamic graph structures. In particular, GTR propagates features within the same graph structure via an intra-graph message passing, and transforms dynamic semantics across multi-domain graph-structured data (e.g. images, sequences, knowledge graphs) for multi-modal learning via an inter-graph message passing. Furthermore, GTR enables effective incorporation of any prior graph structure by weighted averaging of the prior and learned edges, which can be crucially useful for scenarios where prior knowledge is desired. The proposed GTR achieves new state-of-the-arts across three benchmark tasks, including few-shot learning, medical abnormality and disease classification, and graph classification. Experiments show that GTR is superior in learning robust graph representations, transforming high-level semantics across domains, and bridging between prior graph structure with automatic structure learning.
* **Keywords:** Graph neural networks, transformer, attention

# Yuan Li

### Duke University

#### Names

Yuan Li (Preferred)

#### Emails

l\*\*\*\*y@gmail.com

#### Personal Links

#### Education & Career History

**PhD student**

Duke University (duke.edu)

2018 – Present

#### Advisors, Relations & Conflicts

*No relations found*

#### Expertise

*No areas of expertise listed*

# Xiaodan Liang

### Carnegie Mellon University

#### Names

Xiaodan Liang (Preferred)

#### Emails

x\*\*\*\*1@cs.cmu.edu

#### Personal Links

[**Homepage**](https://www.cs.cmu.edu/afs/cs/user/xiaodan1/www/)

#### Education & Career History

**Postdoc**

Carnegie Mellon University (cmu.edu)

2016 – 2018

#### Advisors, Relations & Conflicts

*No relations found*

#### Expertise

*No areas of expertise listed*

# Zhiting Hu

#### Names

Zhiting Hu

#### Emails

z\*\*\*\*h@cs.cmu.edu

#### Personal Links

#### Education & Career History

*No history found*

#### Advisors, Relations & Conflicts

**Gunhee Kim**

g\*\*\*\*e@snu.ac.kr

Coauthor

2011 – 2016

**Gunhee Kim**

g\*\*\*\*e@cs.cmu.edu

Coauthor

2015 – 2015

**Pengtao Xie**

p\*\*\*\*x@cs.cmu.edu

Coauthor

2015 – 2015

**Eric Xing**

e\*\*\*\*g@cs.cmu.edu

Coauthor

2011 – 2014

**Chong Wang**

c\*\*\*\*g@nlpr.ia.ac.cn

Coauthor

2011 – 2014

**Zi Huang**

h\*\*\*\*g@itee.uq.edu.au

Coauthor

2011 – 2014

**Chong Wang**

c\*\*\*\*g@cripac.ia.ac.cn

Coauthor

2011 – 2014

**Xiaofang Zhou**

z\*\*\*\*f@itee.uq.edu.au

Coauthor

2011 – 2014

**Chong Wang**

c\*\*\*\*w@cs.cmu.edu

Coauthor

2011 – 2014

#### Expertise

*No areas of expertise listed*

# Yinbo Chen

#### Names

Yinbo Chen (Preferred)

#### Emails

c\*\*\*\*5@mails.tsinghua.edu.cn

#### Personal Links

#### Education & Career History

*No history found*

#### Advisors, Relations & Conflicts

*No relations found*

#### Expertise

*No areas of expertise listed*

# Eric P. Xing

### Carnegie Mellon University

#### Names

How do you usually write your name as author of a paper? Also add any other names you have authored papers under.

Eric P. Xing,

Eric Xing ,

* Suggest Name

#### Emails

Enter email addresses associated with all of your current and historical institutional affiliations, as well as all your previous publications, and the Toronto Paper Matching System. This information is crucial for deduplicating users, and ensuring you see your reviewing assignments.

e\*\*\*\*g@cs.cmu.edu,

* Suggest Email

#### Personal Links

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#### Education & Career History

Enter your education and career history. The institution domain is used for conflict of interest detection and institution ranking. For ongoing positions, leave the end field blank.

**Professor**

Carnegie Mellon University ( )

Present

**Researcher**

School of Computer Science (cs.cmu.edu)

2006 – Present

* Suggest Position

#### Advisors, Relations & Conflicts

Enter all advisors, co-workers, and other people that should be included when detecting conflicts of interest.

**Gunhee Kim**

g\*\*\*\*e@snu.ac.kr

Coauthor

2010 – 2016

**Pengtao Xie**

p\*\*\*\*x@cs.cmu.edu

Coauthor

2015 – 2015

**Xiaojun Chang**

u\*\*\*\*1@andrew.cmu.edu

Coauthor

2015 – 2015

**Xiaojun Chang**

c\*\*\*\*3@gmail.com

Coauthor

2015 – 2015

**Masashi Sugiyama**

s\*\*\*\*i@k.u-tokyo.ac.jp

Coauthor

2014 – 2014

**Yu Zhang**

z\*\*\*\*6@gmail.com

Coauthor

2011 – 2014

**Yu Zhang**

o\*\*\*\*s@buaa.edu.cn

Coauthor

2011 – 2014

**Li-jia Li**

l\*\*\*\*n@gmail.com

Coauthor

2011 – 2014

**Yuan Xie**

y\*\*\*\*e@ia.ac.cn

Coauthor

2011 – 2014

**Yu Zhang**

z\*\*\*\*u@vrlab.buaa.edu.cn

Coauthor

2011 – 2014

**Rong Yan**

y\*\*\*\*g@gmail.com

Coauthor

2011 – 2014

**Takeo Kanade**

t\*\*\*\*k@cs.cmu.edu

Coauthor

2011 – 2014

**Pengtao Xie**

p\*\*\*\*x@cs.cmu.edu

Coauthor

2011 – 2014

**Jun Zhu**

j\*\*\*\*h@ucla.edu

Coauthor

2011 – 2014

**David Blei**

b\*\*\*\*i@cs.princeton.edu

Coauthor

2011 – 2014

**Jun Zhu**

j\*\*\*\*h@ucla.edu.cn

Coauthor

2011 – 2014

**Fei Gao**

g\*\*\*\*t@gmail.com

Coauthor

2011 – 2014

**Chong Wang**

c\*\*\*\*g@nlpr.ia.ac.cn

Coauthor

2011 – 2014

**Fei-fei Li**

f\*\*\*\*i@cs.stanford.edu

Coauthor

2011 – 2014

**Mario Figueiredo**

m\*\*\*\*f@lx.it.pt

Coauthor

2011 – 2014

**Bin Zhao**

z\*\*\*\*6@gmail.com

Coauthor

2011 – 2014

**Lixin Shen**

l\*\*\*\*3@syr.edu

Coauthor

2011 – 2014

**Yu Zhang**

y\*\*\*\*4@e.ntu.edu.sg

Coauthor

2011 – 2014

**Bin Zhao**

z\*\*\*\*1@purdue.edu

Coauthor

2011 – 2014

**Alexander Hauptmann**

a\*\*\*\*x@cs.cmu.edu

Coauthor

2011 – 2014

**Chong Wang**

c\*\*\*\*w@cs.cmu.edu

Coauthor

2011 – 2014

**Kai Yu**

k\*\*\*\*u@sv.nec-labs.com

Coauthor

2011 – 2014

**Amr Ahmed**

a\*\*\*\*d@lincoln.ac.uk

Coauthor

2011 – 2014

**Jun Zhu**

d\*\*\*\*j@mail.tsinghua.edu.cn

Coauthor

2011 – 2014

**Lixin Shen**

l\*\*\*\*3@syr.edu

Coauthor

2011 – 2014

**Li-jia Li**

l\*\*\*\*i@cs.stanford.edu

Coauthor

2011 – 2014

**Yu Zhang**

z\*\*\*\*u@adsc.com.sg

Coauthor

2011 – 2014

**Fuchun Sun**

f\*\*\*\*n@mail.tsinghua.edu.cn

Coauthor

2011 – 2014

**Yu Zhang**

y\*\*\*\*3@buffalo.edu

Coauthor

2011 – 2014

**Kai Yu**

y\*\*\*\*i@baidu.com

Coauthor

2011 – 2014

**Wei Wu**

w\*\*\*\*i@buaa.edu.cn

Coauthor

2011 – 2014

**Fei Gao**

f\*\*\*\*t@rit.edu

Coauthor

2011 – 2014

**Chong Wang**

c\*\*\*\*g@cripac.ia.ac.cn

Coauthor

2011 – 2014

**Leonid Sigal**

l\*\*\*\*l@disneyresearch.com

Coauthor

2011 – 2014

**Alex Smola**

a\*\*\*\*x@smola.org

Coauthor

2011 – 2014

**Bin Zhao**

b\*\*\*\*o@cs.cmu.edu

Coauthor

2011 – 2014

**Le Song**

l\*\*\*\*g@cc.gatech.edu

Coauthor

2011 – 2014

**Jun Zhu**

j\*\*\*\*9@hotmail.com

Coauthor

2011 – 2014

**Hao Su**

s\*\*\*\*a@gmail.com

Coauthor

2011 – 2014

**Zhiting Hu**

z\*\*\*\*u@gmail.com

Coauthor

2011 – 2014

**Zhiting Hu**

z\*\*\*\*h@cs.cmu.edu

Coauthor

2011 – 2014

**Dit-yan Yeung**

d\*\*\*\*g@cse.ust.hk

Coauthor

2011 – 2014

**Gunhee Kim**

g\*\*\*\*e@cs.cmu.edu

Coauthor

2010 – 2014

**Ross E. Curtis**

j\*\*\*\*s@oup.com

Coauthor

2011 – 2011

**Michael Brudno**

b\*\*\*\*o@cs.toronto.edu

Coauthor

2010 – 2010

**Wenjie Fu**

w\*\*\*\*f@cs.cmu.edu

Coauthor

2009 – 2010

**Michael Jordan**

j\*\*\*\*n@cs.berkeley.edu

Coauthor

2006 – 2006

* Suggest Relation

#### Expertise

For each line, enter comma-separated keyphrases representing an intersection of your interests. Think of each line as a query for papers in which you would have expertise and interest. For example:  
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