

# Matteo Brucato

PH.D. CANDIDATE · DATA AND INFORMATION MANAGEMENT

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## Summary

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**Ph.D. Candidate** at the **University of Massachusetts, Amherst**. Pursuing a Ph.D. in Computer Science in the College of Information and Computer Sciences, Database & Information Management Lab, advised by **Prof Peter J. Haas** and co-advised by **Prof Alexandra Meliou** and **Prof Azza Abouzied** (NYU Abu Dhabi).

## Research Interests

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*Research areas:* Data Management, Natural Language Processing, Deep Learning, Information Retrieval.

*Research interests:* Theoretical and systemic aspects of structured, unstructured, and natural query languages; Scalable approximate query engines; Systems for interactive data exploration.

## Education

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### UMASS AMHERST

PH.D. IN COMPUTER SCIENCE

- Advisor: Peter J. Haas
- Co-Advisors: Alexandra Meliou and Azza Abouzied (NYU Abu Dhabi)

*Amherst, MA, USA*

*2013 - (2019 expected)*

### UNIVERSITY OF BOLOGNA

M.S. IN COMPUTER SCIENCE

- Summa cum laude
- Thesis Advisor: Danilo Montesi
- Thesis: *Temporal Information Retrieval*

*Bologna, Italy*

*2011 - 2013*

### UNIVERSITY OF BOLOGNA

B.S. IN COMPUTER SCIENCE

- Summa cum laude
- Thesis Advisor: Danilo Montesi
- Thesis: *Mobile systems for patient-reported outcomes*

*Bologna, Italy*

*2008 - 2011*

## EXCHANGE PROGRAMS

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### ÅRHUS UNIVERSITY

EXCHANGE PROGRAM DURING M.S., COMPUTER SCIENCE

- Advisor: Christian S. Jensen

*Århus, Denmark*

*Jan - Jun 2013*

### UC RIVERSIDE

EXCHANGE PROGRAM DURING B.S., COMPUTER SCIENCE

- Advisor: Vassilis J. Tsotras

*Riverside, CA, USA*

*Sep - Jun 2011*

## Publications

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- **M. Brucato**, A. Abouzied, A. Meliou  
Package queries: Efficient and scalable computation of high-order constraints  
*The VLDB Journal 2017 (Special Issue on Best Papers of VLDB 2016)*
- **M. Brucato**, A. Abouzied, A. Meliou  
A Scalable Execution Engine for Package Queries  
*SIGMOD Record 2017 (ACM SIGMOD Research Highlight Award 2017)*
- **M. Brucato**, A. Abouzied, C. Blauvelt  
Redistributing Funds across Charitable Crowdfunding Campaigns  
*arXiv:1706.00070*
- **M. Brucato**, J. F. Beltran, A. Abouzied, A. Meliou  
Scalable Package Queries in Relational Database Systems  
*VLDB 2016: 42nd International Conference on Very Large Data Bases*, New Delhi, India, pages 576–587, 2016  
- Award: **Best papers of VLDB 2016**  
- Award: **Invited journal paper in the VLDB Journal (Special Issue on Best Papers of VLDB 2016)**

- Award: **ACM SIGMOD Research Highlight Award (Invited journal paper in SIGMOD Records 2017)**
- Award: **CACM Research Highlight Award (Invited journal paper in CACM Research Highlight 2018)**
- **M. Brucato**, A. Abouzied, and A. Meliou  
Improving Package Recommendations through Query Relaxation  
*Data4U 2014: First International Workshop on Bringing the Value of "Big Data" to Users*, at *VLDB 2014: 40th International Conference on Very Large Data Bases*, Hangzhou, China, pages 13–18, 2014
- **M. Brucato**, R. Ramakrishna, A. Abouzied, A. Meliou  
PackageBuilder: From Tuples to Packages  
*VLDB 2014: 40th International Conference on Very Large Data Bases*, Hangzhou, China, pages 1593–1596, 2014
- K. Fernandes, **M. Brucato**, R. Ramakrishna, A. Abouzied, A. Meliou  
PackageBuilder: Querying for packages of Tuples  
*SIGMOD 2014: ACM SIGMOD International Conference on the Management of Data*, Snowbird, UT, USA, pages 1613–1614, 2014
- **M. Brucato**, D. Montesi  
Metric Spaces for Temporal Information Retrieval  
*ECIR 2014: 36th European Conference on Information Retrieval*, Amsterdam, the Netherlands, pages 385–397, 2014
- **M. Brucato**, L. Derczynski, H. Llorens, K. Bontcheva, C. S. Jensen  
Recognising and Interpreting Named Temporal Expressions  
*RANLP 2013: Recent Advances in Natural Language Processing*, Hissar, Bulgaria, pages 113–121, 2013
- Award: **Best Young Researcher nominee**

## Honors & Awards

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2018	<b>CACM Research Highlight Award (Invited journal paper in CACM Research Highlights)</b>	<i>Amherst, MA, USA</i>
2017	<b>ACM SIGMOD Research Highlight Award (invited journal paper in SIGMOD Records)</b>	<i>Amherst, MA, USA</i>
2017	<b>Invited journal paper in the VLDB Journal, Special Issue on Best Papers of VLDB 2016</b>	<i>Amherst, MA, USA</i>
2016	<b>Best papers</b> , VLDB 2016	<i>New Delhi, India</i>
2013	<b>M.S. with Honors</b> , University of Bologna	<i>Bologna, Italy</i>
2013	<b>Best Young Researcher nominee</b> , RANLP 2013	<i>Hissar, Bulgaria</i>
2013	<b>Merit Scholarship</b> , awarded to 0.2% of all students of the University of Bologna	<i>Bologna, Italy</i>
2012	<b>Research Scholarship</b> , University of Bologna	<i>Bologna, Italy</i>
2012	<b>Merit Certificate</b> , University of Bologna	<i>Bologna, Italy</i>
2012	<b>Complimentary AAAI Membership</b> , Stanford Online AI Course	<i>Stanford, CA, USA</i>
2011	<b>B.S. with Honors</b> , University of Bologna	<i>Bologna, Italy</i>
2011	<b>Merit Certificate</b> , University of Bologna	<i>Bologna, Italy</i>
2010	<b>Merit Certificate</b> , University of Bologna	<i>Bologna, Italy</i>
2010	<b>Exchange Scholarship</b> , University of Bologna	<i>Bologna, Italy</i>

## Professional Experience

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### INDUSTRY

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#### Microsoft Research

*Redmond, WA, USA*

RESEARCH INTERN

*May - Aug 2017*

Worked under the supervision of **Kaushik Chakrabarti** on natural language to SQL using neural networks.

#### IBM Watson

*T. J. Watson Research Center, Yorktown Heights, NY, USA*

RESEARCH INTERN, WATSON HEALTH

*Jun - Aug 2016*

Worked under the supervision of **Shilpa Mahatma** and **Yajuan Wang** on “*conceptual queries*” for healthcare applications.

#### CINECA

*Casalecchio di Reno, Bologna, Italy*

SOFTWARE ENGINEERING INTERN

*Jun - Oct 2012*

- Responsible for developing and managing a data warehouse and analytics system for a nationwide videoconferencing system.
- Duties included generating aggregated data and analytics, deployed through usable interfaces to let decision makers understand usage and performance of the videoconferencing system.

#### Maggiore Hospital

*Bologna, Italy*

SOFTWARE DEVELOPER (VOLUNTEER)

*2011 - 2013*

- Co-developed software to help the Emergency Room visit their patients using portable ultrasound technology.
- Software deployed on medical tablets to help doctors collect patient’s information on the field.
- The collected data was then used to make better informed decisions in the Emergency Room.

### ACADEMIA



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## Database and Information Management Lab, University of Massachusetts

Amherst, MA, USA

RESEARCH ASSISTANT

Sep 2013 - present

- Working with **Prof Peter J. Haas**, **Prof Alexandra Meliou**, and **Prof Azza Abouzied** (NYU Abu Dhabi) to create  **Package Builder**, a system that extends query engines to support the generation of *packages*, i.e., collections of tuples with global properties that are true of the entire collection.
- Invited journal paper at CACM Research Highlights 2018.
- Invited journal paper at the VLDB Journal 2017.
- Invited journal paper at SIGMOD Records 2017.
- Technical paper at VLDB 2016; workshop paper and demo paper at VLDB 2014; undergraduate research poster at SIGMOD 2014.
- Project website: [packagebuilder.cs.umass.edu](http://packagebuilder.cs.umass.edu).
- DB Lab website: [dbgroup.cs.umass.edu](http://dbgroup.cs.umass.edu).
- Project code: Scalable-PaQL-Queries on  GitHub

## Design Technology Lab, NYU Abu Dhabi

Abu Dhabi, UAE

VISITING PH.D. CANDIDATE

Mar - May 2016

- Paper: Redistributing Funds across Charitable Crowdfunding Campaigns (arXiv:1706.00070).

## AMPLab, UC Berkeley

Berkeley, CA, USA

VISITING PH.D. STUDENT

May - Aug 2015

- Worked on extensions to Package Builder to identify ideal packages by example, under NYU Summer internship.

## Data-Intensive Systems Lab, Århus University

Århus, Denmark

VISITING M.S. STUDENT

Jan - Jun 2013

- Worked on M.S. thesis on *Temporal Information Retrieval* under the supervision of **Prof Christian S. Jensen**.
- Actively collaborated with researchers within the group.
- Published two papers in main international conferences in the fields of NLP and IR.

## Database Lab, UC Riverside

Riverside, CA, USA

UNDERGRADUATE RESEARCH INTERN (VOLUNTEER)

Jan - Jun 2013

- Worked closely with a Ph.D. candidate and **Prof Vassilis J. Tsotras** on query optimization techniques for query result diversification.
- Developed a query parser for a SQL-like diversification query language.
- Devised and developed a query optimizer to select optimal diversification query plans.
- Developed client/server technology to issue and evaluate diversification queries.

## Professional Service & Leadership

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### Lab Tzar

Amherst, MA, USA

UMASS AMHERST DATABASE LAB

2014 - 2015

- Coordinated weekly discussion seminar, including invited talks and paper readings, for the UMass Amherst Database Research group (~10 Ph.D. students and faculty), and webmaster duties.

### Student Seminar Leader

Amherst, MA, USA

UMASS AMHERST DATABASE LAB

Fall 2015

- Organized and coordinated a weekly discussion seminar among Ph.D. and M.S. students in the UMass Amherst Database Research group to foster research collaborations, exchange of ideas, group discussions, and group cohesion.

### Guest Editorial Board

2014 - 2015

- *Information Processing and Management*, special issue on *Time and Information Retrieval*, Elsevier, 2014/2015.

### External Review Committee

2013 - 2015

- VLDB 2017
- SIGMOD 2015
- VLDB 2015
- RANLP 2013

## Teaching & Mentoring

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### Teaching Assistant

Undergraduate Database Systems (CS 345)

UMASS AMHERST

Fall 2015

- Responsible for occasional lectures, project advising, office hours, homework and project grading.

### Research Mentor

Graduate student Sandhya Sankaranarayanan

UMASS AMHERST

Fall 2015

- Sandhya and I worked together on extending the package query language PaQL.

## Research Mentor

*Undergraduate student Kevin Fernandez (now M.D. Candidate at Albert Einstein College of Medicine)*

UMASS AMHERST

Spring 2014

- Kevin and I worked together on evaluation techniques for package queries. This work was invited to present at the *ACM SIGMOD 2014 Undergraduate Research Poster Competition*.

## Research Mentor

*Graduate student Rahul Ramakrishna*

UMASS AMHERST

2013 - 2014

- Rahul and I worked together on interface abstractions for package queries. Our work was demonstrated at *VLDB 2014*.

## Talks

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### INDUSTRY

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#### Scalable Package Queries in Relational Database Systems

*Redmond, WA, USA*

MICROSOFT RESEARCH

Jun 2017

#### Conceptual Queries for Multiple Data Sources

*Austin, TX, USA*

IBM WATSON

Aug 2016

#### Package Queries: From Tuples to Packages

*Berkeley, CA, USA*

BERKELEY LABS

Jul 2015

### ACADEMIA

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#### Scalable Package Queries in Relational Database Systems

*New Delhi, India*

VLDB 2016

Sep 2016

- Slides: [packagebuilder.cs.umass.edu/papers/scalable-paql-presentation-share.pdf](http://packagebuilder.cs.umass.edu/papers/scalable-paql-presentation-share.pdf)

#### Package Queries: From Tuples to Packages

*Berkeley, CA, USA*

AMPLAB, UC BERKELEY

Jun 2015

#### Improving Package Recommendations through Query Relaxation

*Hangzhou, China*

VLDB 2014

Sep 2014

- Slides: [packagebuilder.cs.umass.edu/papers/package-recomm-slides-web.pdf](http://packagebuilder.cs.umass.edu/papers/package-recomm-slides-web.pdf)

#### Metric Spaces for Temporal Information Retrieval

*Amsterdam, the Netherlands*

ECIR 2014

Apr 2014

#### Metric Spaces for Temporal Information Retrieval

*Bologna, Italy*

UNIVERSITY OF BOLOGNA

Dec 2013

#### Metric Spaces for Temporal Information Retrieval

*Århus, Denmark*

ÅRHUS UNIVERSITY

Jan 2013

## Main Coursework

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### Graduate

- Approximation Algorithms
- Advanced Algorithms
- Advanced Database Systems
- Machine Learning
- Information Retrieval
- Artificial Intelligence
- Theory of Computation

### Undergraduate

- Algorithms and Data Structure
- Databases
- Operating Systems
- Software Engineering
- Functional Programming

### Online Courses

- Introduction to Artificial Intelligence @ [www.ai-class.com](http://www.ai-class.com). Top 5% of the class with a score of 99.6%.
- Artificial Intelligence: Programming a Robotic Car @ [www.udacity.com](http://www.udacity.com). Completed with Highest Distinction.

## Technical Skills

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<b>Programming</b>	Python, Java, C/C++, Scheme, Pascal, Assembly
<b>Data Science Tools</b>	Scipy, Numpy, Scikit-Learn, Matplotlib, Gnuplot, Matlab, Mathematica, $\LaTeX$
<b>Database</b>	PostgreSQL, MySQL, SPARQL
<b>Admin</b>	UNIX, Shell scripting
<b>Web</b>	Django (Python), Node.JS, Javascript, AngularJS, JQuery, HTML5, CSS, XML, XSLT
<b>Languages</b>	English, Italian

## Societies

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- 2014 **ACM SIG**, Member
- 2012 **AAAI**, Complimentary Membership

## References

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Available upon request.