# Natural Logic Meets Machine Learning NALOMA'20
## Welcome to the workshop!

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on Logic, Language, and Information
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ON NATURALLY OCCURRING TEXT
AT A LEVEL COMPARABLE TO HUMANS.

Wait, is this even true?

This claim is an exaggeration.

But it is nevertheless the case that neural learners are capable of much more today than we thought they would be a few years ago.

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>
> Does this change logic?

In the other direction, there already was a field of natural logic.

Although it was/is small, it has seen a resurgence in recent years.

## PROGRAM OF NATURAL LOGIC

Capture inference patterns whose structure is close to
what we find in natural language.

Craft systems of logic using syntax that resembles, as closely as
possible, the syntax of natural language,
and define proof systems which work directly over these "surface"
forms.

Show that significant parts of natural language inference
can be carried out in decidable logical systems,
preferably in "light" systems.

Ask how much of the subject could have been done
if the traditional logicians
had today's mathematical tools.

Do all this in as mathematically and computationally as possible.

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▶ Indeed, it could rework semantics based on
computational linguistics.

For more about it, here are two resources:

Johan van Benthem's paper A Brief History of Natural Logic.

Also, my course notes from NASSLLI'18.

Work on natural logic has picked up in recent years.

There is renewed interest in monotonicity inference,
and connections with theorem provers and tableau systems
from standard areas of logic.

Our workshop accelerates the confluence
of machine learning and natural logic.

▶ People in natural logic began to experiment with machine learning.

▶ People in Natural Language Inference (NLI) sometimes use computational systems for inference, especially after

MacCartney, B. and Manning, C. D. (2009).
An extended model of natural logic.
Eighth International Conference on Computational Semantics.

Indeed, for NLI, this is the usual meaning of "natural logic".

▶ Workshops like this are good for NASSLLI/WeSSLLI.
They are like conference experiences done as part of our school.

# THE NALOMA PROGRAM COMMITTEE

- ▶ Lasha Abziniadize, University of Groningen / Utrecht University

- ▶ Stergios Chatzikyriakidis, University of Gothenburg, CLASP.

- ▶ Hai Hu, Department of Linguistics, Indiana University.

- ▶ Thomas Icard, Department of Philosophy, Stanford University.

- ▶ Aikaterini-Lida Kalouli, Department of Linguistics, University of Konstanz.

- ▶ Hitomi Yanaka, RIKEN.

- ▶ Ignacio Cases and Lauri Karttunen (today)

- ▶ Mark Steedman (Tuesday)

- ▶ Ellie Pavlick (Thursday)

# Some recent publications, just to flash by

📄 Lasha Abzianidze.
LangPro: Natural language theorem prover.

📄 Jean-Philippe Bernardy, Rasmus Blanck, Stergios
Chatzikyriakidis, Shalom Lappin, and Aleksandre
Maskharashvili.
Bayesian inference semantics: A modelling system and A test
suite.

📄 Jean-Philippe Bernardy and Stergios Chatzikyriakidis.
A corpus of precise natural textual entailment problems.

📄 Jean-Philippe Bernardy and Stergios Chatzikyriakidis.
What kind of natural language inference are NLP systems
learning: Is this enough?

📄 Ignacio Cases and Lauri Karttunen.
Neural networks and textual inference: How did we get here
and where do we go now?

📄 Atticus Geiger, Ignacio Cases, Lauri Karttunen, and
Christopher Potts.
Stress-Testing Neural Models of Natural Language Inference
with Multiply-Quantified Sentences.

📄 Mohammad Javad Hosseini, Nathaniel Chambers, Siva Reddy,
Xavier Holt, Shay Cohen, and Mark Johnson.
Learning Typed Entailment Graphs with Global Soft
Contraints.

# Some resources, just to flash by

📄 Hai Hu, Qi Chen, and Larry Moss.
Natural language inference with monotonicity.

📄 Hai Hu and Lawrence S. Moss.
Polarity computations in flexible categorial grammar.

📄 Aikaterini-Lida Kalouli, Annebeth Buis, Livy Real, Martha Palmer, and Valeria de Paiva.
Explaining simple natural language inference.

📄 Aikaterini-Lida Kalouli, Richard Crouch, and Valeria de Paiva.
GKR: Bridging the gap between symbolic/structural and distributional meaning representations.

📄 Aikaterini-Lida Kalouli, Valeria de Paiva, and Livy Real.
Correcting contradictions.

📄 Aikaterini-Lida Kalouli, Livy Real, and Valeria de Paiva.
Textual inference: Getting logic from humans.

📄 Aikaterini-Lida Kalouli, Livy Real, and Valeria de Paiva.
Wordnet for "easy" textual inferences.

📄 Pascual Martínez-Gómez, Koji Mineshima, Yusuke Miyao, and Daisuke Bekki.
On-demand injection of lexical knowledge for recognising textual entailment.

📄 R Thomas McCoy, Ellie Pavlick, and Tal Linzen.
Right for the wrong reasons: Diagnosing syntactic heuristics in natural language inference.

📄 Kyle Richardson, Hai Hu, Lawrence S Moss, and Ashish Sabharwal.
Probing natural language inference models through semantic fragments.

📄 Ian Tenney, Dipanjan Das, and Ellie Pavlick.
BERT rediscovers the classical NLP pipeline.

📄 Sabine Weber and Mark Steedman.
Construction and Alignment of Multilingual Entailment Graphs for Semantic Inference.

📄 Hitomi Yanaka, Koji Mineshima, Daisuke Bekki, Kentaro Inui, Satoshi Sekine, Lasha Abzianidze, and Johan Bos.
Can neural networks understand monotonicity reasoning?

📄 Hitomi Yanaka, Koji Mineshima, Daisuke Bekki, Kentaro Inui, Satoshi Sekine, Lasha Abzianidze, and Johan Bos.
HELP: A dataset for identifying shortcomings of neural models in monotonicity reasoning.

📄 Hitomi Yanaka, Koji Mineshima, Pascual Martínez-Gómez, and Daisuke Bekki.
Acquisition of phrase correspondences using natural deduction proofs.

These talks 30 minutes long.

So there won't be time to have for questions during the talks.

But we have plenty of time for questions at the end of each day, and we're planning a panel discussion of the entire workshop for Friday afternoon.

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Enjoy!