

Curriculum Vitae

Roussanka Loukanova

December 6, 2025

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Part I

CV Résumé

Name Roussanka Loukanova
E-mail rloukanova@gmail.com
URL: <https://www.math.bas.bg/logic/loukanovarp>
<https://www.math.bas.bg/logic/loukanovarp/cv.pdf>
<https://www.math.bas.bg/logic/loukanovarp/publications.pdf>
<https://staff.math.su.se/rloukanova/>
Languages English (fluent), Bulgarian (native), Russian (fluent, dormant),
 Swedish (fluent reading; simple writing; simple speech), French (idle)

1 Education and Degrees

Bachelor program in Mathematics: 1973 – 1976

Faculty of Mathematics and Mechanics (current Faculty of Mathematics and Informatics)
 Sofia University, Sofia, Bulgaria

M.Sc. program and degree in Mathematics: 1976 – 1978

M.Sc. degree in Mathematics: awarded July 1978

Specialization: Mathematical Logic

Department of Mathematical Logic and Applications, Faculty of Mathematics and Mechanics
 (current Faculty of Mathematics and Informatics), Sofia University, Sofia, Bulgaria

M.Sc. thesis subject: Generalized Recursion Theory

M.Sc. program and degree in Computer Science: 1998 – 1999

Department of Computer Science, Indiana University, Bloomington, IN, U.S.

Ph.D. program and degree in Mathematics: 1986 – 1992

Department of Discrete Mathematics, Faculty of Mechanics and Mathematics,

Moscow State University (MGU), Moscow, USSR — current Russia;

Saratov State University, Saratov, USSR — current Russia;

Department of Mathematics, University of Oslo, Norway, 1989 – 1990,

research work on my Ph.D. thesis, funded by

the Norwegian Research Council for Science and Humanities

Specialization code 01.01.09 — Mathematical Cybernetics

Subjects: Discrete Mathematics, Logic, Computability, Foundations of Computer Science,
 Formal Languages, Automata Theory, Computational Linguistics, Language Processing

Ph.D. dissertation: Situation Semantical Analysis of Natural Language

Adviser: Dr. of Sc., Academician, Professor Valery Borisovich Kudryavtsev

Faculty of Mechanics and Mathematics, Moscow State University (MGU), Moscow, Russia

Co-supervision: Professor Jens Erik Fenstad

Department of Mathematics, University of Oslo, Norway

Awarded degree: Ph.D. in Physical and Mathematical Sciences; date: 13 May 1992,

Higher Testimonial Committee at the Council of Ministers of USSR, Saratov State University,
 Saratov; Ph.D. diploma: KD No 010991, Moscow, 3 July 1992; Russia

2 Academic Qualification

Documentation upon request:

- Universitetslektor i datorlingvistik — Senior Lecturer / Associate Professor in Computational Linguistics, Uppsala University, Uppsala, Sweden (February 1 2002)
- Associate Professor in Computer Science — an assessment by an international committee at Aalborg University, Denmark (13 April 2015)
- Senior Assistant Professor in Mathematics
Department of Mathematical Logic and Applications, Faculty of Mathematics and Informatics, Sofia University, Sofia, Bulgaria (June 29 1992)

3 Pedagogic Training

- Continuous work in the educational system of the Faculty of Mathematics and Informatics, Sofia University, Sofia, Bulgaria
- Extensive and continuous work in education at international universities
- A course *Teaching Computer Science* taken at the Department of Computer Science, Indiana University, Bloomington, IN, U.S.; September 1999 – December 2000
- *International Teacher Training Course*, Uppsala University, Uppsala, Sweden, 2006
- Publications on pedagogy

4 Employment

4.1 Present

15 June 2024 – present: Associate Member

Department of Algebra and Logic, Institute of Mathematics and Informatics (IMI)
Bulgarian Academy of Sciences (BAS), Sofia, Bulgaria

<https://www.math.bas.bg/logic/loukanovarp>

<https://math.bas.bg/department-algebra-and-logic/?lang=en>

4.2 Former Positions

October 23 1978 – December 15 1982: Specialist (Mathematics)

Computer Center of Ministry of Communications

Motherhood Leave: June 1979 – June 1982

December 20 1982 – August 1 1984: Specialist (Mathematics)

Computer Center of Institute of Agricultural Sciences, Sofia, Bulgaria

Assignment: handling mathematics and programming in information systems

August 1 1984 – August 1 1986: Mathematician

Laboratory of Mathematical Linguistics

Institute of Mathematics and Informatics, Bulgarian Academy of Sciences, Sofia, Bulgaria

United Center of Mathematics and Mechanics, joined institution between:

Institute of Mathematics and Informatics, Bulgarian Academy of Sciences

and Faculty of Mathematics and Informatics, Sofia University Sofia, Bulgaria

August 1 1986 – June 29 1992: Assistant Professor

Department of Mathematical Logic

Faculty of Mathematics and Informatics, Sofia University

Sofia, Bulgaria

June 29 1992 – July 2 2001: Senior Assistant Professor in Mathematics
(as of June 29 1992, when awarded, by leaving abroad in June 1997)
approaching Associate Professor in Mathematics
Department of Mathematical Logic and Applications
Faculty of Mathematics and Informatics, Sofia University, Sofia, Bulgaria
Assignment:

- (1) teaching:
 - Discrete Mathematics
 - Logic — separate courses for students majoring in Mathematics and Computer Science
 - Computability
 - Foundations of Computer Science
 - Formal Languages and Automata Theory
 - Computational Linguistics
 - Language Processing
 - Computational Semantics
- (2) research

August 2000 – December 2001: Visiting Assistant Professor approaching Associate Professor
Department of Mathematics and Computer Science
Illinois Wesleyan University, Bloomington, IL, U.S.

Assignment: teaching courses in mathematics and computer science:

- Introduction to the WEB
- Computer Science
- Calculus I, Calculus II
- Finite Mathematics

February 1 2002 – May 31 2010: Universitetslektor i Datorlingvistik / Senior University Lecturer / Associate Professor in Computational Linguistics, Uppsala University (UU)
(closed for lack of students in the program of Computational Linguistics, UU)
Department of Linguistics and Philology, Uppsala University, Uppsala, Sweden
Assignment:

- (1) 80% teaching courses in the areas of Computational Linguistics and related subjects, e.g:
 - Foundations of Computer Science I
 - Foundations of Computer Science II
 - Computational Grammar I
 - Computational Grammar II
 - Computational Semantics
 - Algorithms for Computational Semantics I
 - Algorithms for Computational Semantics II
 - Applied Automata Theory for Computational Linguists
 - Algorithms and Data Structures in Object Oriented Programming
 - Information Retrieval
 - Research Seminar in Computational Linguistics
 - Mathematical Linguistics
 - Formal Syntax
 - Introduction to Natural Language Processing for IT / Computer Scientists
- (2) 20% research

June 1 2010 – September 30 2014: Independent Research, Uppsala, Sweden
support: Försäkringskassan

October 1 2014 – June 30 2016; July 1 2016 – June 30 2017:
Guest Lecturer and Forskare / Researcher
Department of Mathematics, Stockholm University, Stockholm, Sweden
<https://staff.math.su.se/rloukanova/>
Assignments:

- (1) own research, teaching, participation in seminars, writing articles
- (2) teaching; e.g., series of lectures and seminars, Logics for Linguistics:
<https://staff.math.su.se/rloukanova/logling/>
- (3) participation in research projects

July 1 2017 – June 30 2018: Forskare / Researcher
Department of Philosophy, Stockholm University, Stockholm, Sweden
Assignments: own research, participation in seminars, writing articles, teaching supervision

19 August 2019 – 15 June 2024: Mathematician, PhD
Department of Algebra and Logic, Institute of Mathematics and Informatics (IMI)
Bulgarian Academy of Sciences (BAS), Sofia, Bulgaria

4.3 Visiting Positions and Fellowships

November 1989 – April 1990: Visiting Researcher
Department of Mathematics, University of Oslo, Oslo, Norway
Assignment: Research in Computational Semantics
funded by a grant from the Norwegian Research Council for Science and Humanities in support of work on my Ph.D.

February – March 1994: Visiting Researcher
Center for Cognitive Science, Edinburgh, UK
Assignment: Research in Computational Semantics
funded by a grant under a Tempus project

February – May 1995: Visiting professorship
Department of Computer Science / Datalogisk Institut (DIKU), University of Copenhagen, Copenhagen, Denmark
Assignment: research and teaching in Computational Semantics

July 1997 – June 1998: Visiting professorship
Department of Mathematics, Indiana University, Bloomington, IN, U.S.
Assignment: teaching courses in Finite Mathematics and Mathematical Foundations of Cognitive Science

July 1998 – July 2000: Visiting while on sabbatical
Department of Computer Science, Indiana University, Bloomington, IN, U.S.
Assignment: teaching courses in Computer Science, e.g., Introduction to Computer Science (with programming), Discrete Mathematics, Theory of Computing, taking graduate courses in Computer Science

Spring Term 2000: Visiting Assistant Professor

Institute of Linguistics, University of Minnesota, Minneapolis, MN, U.S.

Assignment: teaching courses in

- Computational Linguistics
 - A-1 Computational Syntax
 - A-2 Computational Semantics (Logic; Methods of Logic for Computational Semantics)
- Topics in Computational Syntax and Semantics, with emphasis on Computational Semantics

August 2000 – December 2001: Visiting Assistant Professor

Department of Mathematics and Computer Science

Illinois Wesleyan University, Bloomington, IL, U.S.

Assignment: teaching courses in mathematics and computer science:

- Introduction to the WEB
- Computer Science
- Calculus I, Calculus II
- Finite Mathematics

May 2008: Visiting fellow

Department of English Linguistics, University of Göttingen, Germany

Assignment:

- research: Constraint-Based Grammar and Computational Semantics
- participation in the departmental research seminars
- weekly research meetings on Moschovakis Theory of Recursion
- teaching distantly, via Internet, a course at Uppsala University

September – December 2008: Visiting fellow

Tilburg Center for Logic and Philosophy of Science (TiLPS)

Tilburg University, Tilburg, The Netherlands

Assignment: research, while teaching at Uppsala University, via Internet

- Computational Semantics I (distance course)
- Applied Automata Theory for Computational Linguists (distance course)

December 2015 – January 2016: Guest Researcher

Department of Mathematics, Indiana University, Bloomington, IN, U.S.

December 2017: fellow of the Logic Group, Department of Mathematics, Stockholm University, Sweden, by CORCON grant, for research visiting at: Department of Mathematics and Statistics, University of Canterbury, Christchurch, New Zealand

March 2018: fellow of the Logic Group, Department of Mathematics, Stockholm University, Sweden, by a grant of the project: Computing with Infinite Data (CID) for research visiting at: School of Information Science, Japan Advanced Institute of Science and Technology (JAIST), Nomi, Japan

Part II

Scientific Expertise

5 Expertise

My expertise is on computational theories from the areas of Mathematical Logic, Theory of Computation, and their foundations of Computer Science and other computational sciences.

More specifically, my work has been in the following subjects:

- Type-Theoretic approaches to information theory and information processing
 - Dependent-Type Theory of Situated Information
 - Type-Theory of Algorithms
- Recursion Theory
- Computational Syntax — classic and new theories of formal and natural languages
- Automata Theory
- Mathematical and Computational Linguistics
- Computational Semantics of Formal and Natural Languages
- Computational Syntax-Semantics Interfaces in Formal and Natural Languages
- Partiality, underspecification, and dependency on situations, context, time, and agents, in information and languages
- Generalized Computational Grammar of Natural Language — covering lexicon and syntax-semantics interface
- Type-Theoretic Grammars
- Constraint-Based Lexicalized Grammar (CBLG) of Natural Language
- Computational Biology: DNA and Cell Computing based on formal languages and automata theory
- Bio-inspired Computational Theories of Information and Language — theory of computation, including classic and new theories of languages and automata; Computational models of information and languages based on their biological phenomena, via SynSem interfaces
- Type-Theoretic Approach to Computational Neuroscience of Information and Language — based on theory of computation, including classic and new theories of languages and automata
- Artificial Intelligence

Primarily, my research has been on theoretical developments of syntax-semantics interfaces in natural and formal languages, from the perspective of their nature. My work targets technology advancements in computational sciences and applications.

The focus of my research is on computational models of *partiality, underspecification, and dependency on situations, context, time, and agents, in information and languages*.

I have been working along the following major lines:

- (1) New approach to the mathematical notion of algorithm: formalization of algorithms with recursion and iteration
- (2) New approach to Type-Theory of Situated Information: a computational approach to integration of declarative and procedural, dynamic computations, provided with memory for saving and updating partial, underspecified, situated, and agent dependent information
- (3) I have initiated work on integration of logic with quantitative mathematics, as theoretical foundation of Theory of Computation. The target of this integration advancement is applications to Data Science, Computational Linguistics, AI, Computational Neuroscience, advanced technology, etc.

By my work on new theoretical developments, I have been targeting fine-grained adequateness of computational processing of information and languages:

- in generalized and parametric varieties
- in various specific areas and domains, e.g., in forensics, medical sciences, healthcare, jurisdiction, law, etc.
- for computational models of memory, knowledge, reasoning, and communications, according to their biological phenomena

Such work benefits development of new approaches, methods, and techniques in Information Systems, Data Science, including Machine and Deep Learning.

Currently, my work is on theoretical developments of new methods and techniques, in Mathematical and Computational Linguistics, for advancements in language and information processing.

General Scientific Interests: My work is in conjunction with technology advancements. The areas that are directly and interdisciplinary interrelated are:

- Mathematical and Computational Linguistics
- Natural Language Processing (NLP)
- Text Processing
- Computational Biology, in particular, Neuroscience of Information and Language
- Artificial Intelligence (AI)
- Robotics
- Human-Computer Communications
- Methods of Computational Verification
- Automatic and Semi-Automatic Proofs in Mathematics
- Data Science
- other related advanced technologies and applications

6 Research Topics

Development of computational information theory is an open interdisciplinary area that has many applications, and usually requires integration of work on various topics. Such efforts have shaped my work on the following subjects:

Information Theory

- Type-Theory of Situated Information: work on new developments
- Type-Theory of Parametric, Situated Algorithms
- Semantics of natural and artificial languages
- Computational models based on biological phenomena of information and natural languages

Classical and Non-classical Logic: Type Theories

- Intensional Logic: IL and PTQ (approaches following Montague, 1970-73), TY_2 (approaches following Gallin, 1975)
 - Dependent-Type Theories (Martin-Löf, 1984 – now; Aczel, 2009 – now)
 - Situation Theory (Barwise, 1980s; Loukanova, 1989 – now)
 - Higher-Order Type-Theory of Algorithms, Dependent-Type Theory of Information
- I work on new developments of theory and applications

Algorithms and Computation

- Formal Languages, Grammars, and Automata
- Recursion Theory: axiomatic and higher-order recursion

Applications of Mathematical Logic and Theory of Computation

- Type Theory for modeling partiality, underspecification, situation dependency, and algorithms
- Typed Situation Theory and Situation Semantics
- Computational syntax, semantics, and syntax-semantics interfaces
 - Computation and formal languages: grammars, automata, parsing
 - Unification Grammars, Constraint-Based Lexicalized Grammars: e.g., Definite Clause Grammars (DCG), Generalised Phrase Structure Grammar (GPSG), Head-Driven Phrase Structure Grammar (HPSG), Lexical Functional Grammar (LFG), Categorical Grammars (CG)
- Type-Theoretical Grammar with dependent types — formalization of constraint-based, lexicalized grammars (HPSG, LFG, GF, etc.) with types with constraints
 - formalization of common ideas of constraint-based, lexicalized grammars (HPSG, LFG, GF, etc.)
 - applications to natural languages
- Computational Syntax-Semantics Interfaces: interdependency between syntax and semantics
- Development of generalized computational grammar based on dependent types and syntax-semantics interfaces

Bio-inspired Type-Theory of Information

- Computational models of information and languages
- Bio-inspired computational grammar with syntax-semantics interface: computational models of information and languages in nature
- Computational neuroscience of information and language
- Development of systems of computing and semantic processing based on natural phenomena of information and language
- New approaches to technologies for processing partial and underspecified information
- Dynamic syntax-semantics interfaces

Part III

Software

7 Experience with Software Packages

Software and Programming: Alongside background and expertise in theoretical foundations, I have experiences with software packages, automatic proof systems, model checkers, verification techniques for programming, large-scale computational grammars of human language (e.g., Stanford HPSG / LKB / The CSLI LinGO Project, HPSG TRALE, Chalmers GF).

I have tried and used varieties of programming and specification languages.

By experiences with software packages, automatic proof systems, model checkers, verification techniques for programming, and especially with large-scale grammars of human language, I have encountered the many sides of software development, e.g., adequateness of software; efficiency; portability and compatibility with other systems; choice of programming languages; etc. By that, I see needs of integrated approaches. To address such problems, my research has been on development of new computational theories of language and information.

- Theorem Provers, extensive experience, e.g., with:
 - the automated proof checking system MIZAR

- the PVS Specification and Verification System (SRI Int.) — a specification language integrated with support tools and a theorem prover
- Fitch — Natural Deduction proof assistant for First Order Logic; Logical Reasoning with Diagrams and Sentences (LRDS) (<https://www.gradgrinder.net>)
- Model Checkers, extensive experience, e.g.:
 - SMV System
 - Tarski's World, for First Order Logic (<https://www.gradgrinder.net>)
- Large-scale grammars of human languages, e.g.:
 - LKB, CSLI LinGO Project
I have extensive experience with LKB.
Stanford University, Center for the Study of Language and Information (CSLI) (<https://github.com/delph-in/docs/wiki/LkbTop>) Accessed 2024 July 30
 - *HPSG TRALE*, a grammar development system for Head-Driven Phrase Structure (HPSG) (<https://hpsg.hu-berlin.de/Software/>) Accessed 2024 July 30
 - Chalmers *GF*, *Gramatical Framework* (<https://www.grammaticalframework.org/>) as a part of my research and course projects on foundations of generalized CBLG and type-theoretic grammar of human languages
- Software and courseware packages, with which I have extensive experience:
 - *Language, Proof and Logic: Tarski's World, Fitch, Boole*, (LPL) by Dave Barker-Plummer, Jon Barwise, and John Etchemendy (<https://www.gradgrinder.net>)
at CSLI Publications, Stanford:
(<https://web.stanford.edu/group/cslipublications/cslipublications/site/9781575866321.shtml>)
 - Logical Reasoning with Diagrams and Sentences (LRDS), by Dave Barker-Plummer, Jon Barwise, and John Etchemendy and the advanced natural deduction software Hyperproof (<https://www.gradgrinder.net/Products/lrds-index.html>)
 - Formal Grammars and Automata Software packages, e.g.:
 - * *Turing's World*. Dave Barker-Plummer, Jon Barwise, and John Etchemendy
 - * *JFLAP: An Interactive Formal Languages and Automata Package* (<https://www.jflap.org>) / (<https://www2.cs.duke.edu/cseds/jflap/>) Accessed 2024 July 30
 - * Finite State Technology of XEROX

Part IV

Pedagogic Profile

Upon request, I can provide documents referred to in the following sections.

8 Experience in Teaching

My major expertise in teaching is in:

- *Mathematical Logic*
- *Discrete Mathematics*
- *Theory of Computability* and *Theory of Computation*

- *Theory of Formal Languages and Automata Theory*
- *Recursion Theory*
- *Mathematical Foundations of:*
Computational Linguistics, Natural Language Processing, Computer Science
- *Applications of Logic to:*
Computational Linguistics, Natural Language Processing, Computer Science
- *Natural Language Processing*
- *Mathematical Methods in Computational Linguistics*
- *Computational Syntax*
- *Computational Semantics*
- *Computational Syntax, Semantics, and Syntax-Semantics Interfaces*
- *Computational Syntax-Semantics Interfaces*
- *Natural Language Processing in Artificial Intelligence*
- *Mathematical Foundations of Cognitive Science*

8.1 Courses Taught and Developed

- *Theory of Computability*
- *Theory of Formal Languages and Automata Theory*
- *Applied Automata Theory*
- *Mathematical Foundations of Computer Science*
- *Mathematical Logic*
- *Logical Methods in Linguistics*
- *Formal and Computational Syntax and Semantics*
- *Discrete Mathematics*
- *Finite Mathematics*
- *Situation Theory and Situation Semantics*
- *Mathematics and Logic for Cognitive Science*
- *Computational Linguistics*
- *Topics in Syntax and Semantics*
- *Introduction to Computer Science*
- *Introduction to the WEB*
- *Calculus I, II*
- *Information Retrieval*
- *Algorithms and Data Structures*
- *Programming Languages*
- *Logic*
- *Mathematical Linguistics*
- *Natural Language Processing for Computer Science Students*
- *Formal Syntax*
- *Computational Grammar*
- *Computational Syntax and Parsing Algorithms*
- *Computational Semantics*
- *Logics for Linguistics*, a series of lectures and seminars (co-organiser and lecturer):
<https://staff.math.su.se/rloukanova/logling>

8.2 Guest-teaching Abroad

I have extensive experience in teaching and courses development in Mathematics, Computer Science, and Computational Linguistics, for international programs:

February – May 1995: Visiting professorship

Datalogisk Institut (DIKU), Copenhagen University, Copenhagen, Denmark

Work Assignment: research and teaching in Computational Semantics

July 1997 – June 1998: Visiting professorship

Department of Mathematics, Indiana University, Bloomington, IN, U.S.

Work Assignment: teaching courses in Finite Mathematics and Mathematical Foundations of Cognitive Science

July 1998 – July 2000: Visiting while on sabbatical

Department of Computer Science, Indiana University, Bloomington, IN, U.S.

Work Assignment: teaching courses in Computer Science, e.g., Introduction to Computer Science (with programming), Discrete Mathematics, Theory of Computing, taking graduate courses in Computer Science

Spring Term 2000: Visiting Assistant Professor

Institute of Linguistics, University of Minnesota, Minneapolis, MN, U.S.

Work Assignment: teaching courses in

- Computational Linguistics
 - A-1 Computational Syntax
 - A-2 Computational Semantics (Logic; Methods of Logic for Computational Semantics)
- Topics in Computational Syntax and Semantics, with emphasis on Computational Semantics

August 2000 – December 2001: Visiting Assistant Professor (approximately equiv. to Associate Professor)

Department of Mathematics and Computer Science

Illinois Wesleyan University, Bloomington, IL, U.S.

Work Assignment: teaching courses in mathematics and computer science:

- Introduction to the WEB
- Computer Science
- Calculus I, Calculus II
- Finite Mathematics

May 2008: Visiting fellow

Department of English Linguistics, University of Göttingen, Germany

Along with my research, I was teaching distantly, via Internet, a course at Uppsala University

September – December 2008: Visiting fellow

Tilburg Center for Logic and Philosophy of Science (TiLPS)

Tilburg University, Tilburg, The Netherlands

Work Assignment: research, while teaching at Uppsala University, via Internet

- Computational Semantics I (distance course)
- Applied Automata Theory for Computational Linguists (distance course)

All courses that I taught on formal and computational grammar, syntax, and semantics have been developed and delivered by myself: lectures, computer labs, course assignments, and projects.

Teaching at Sofia University, Bulgaria, 1984 – 1997: During my work at the Faculty of Mathematics and Informatics, Sofia University, Sofia, Bulgaria, between August 1 1984 and June 30 1997, I regularly taught the following courses:

- Discrete Mathematics
- Logic — separate courses for students majoring in Mathematics and Computer Science
- Computability
- Foundations of Computer Science
- Formal Languages and Automata Theory
- Computational Linguistics
- Language Processing
- Computational Semantics

During that period, except for the times of leaves, I taught at least two courses every term. For the courses in Discrete Mathematics, Logic, Computability, and Foundations of Computer Science, I took part in the major course lectures, by following instructions from the professors that were responsible for the subjects. Primary, was responsible, on regular basis, for the practical teaching of 3-6 groups per course. Each group had about 15 students. The course lessons, for each group, were 4 hours per week (two lesson sessions per week) running during regular teaching terms of 14-15 weeks. The examinations consisted of weekly written-homework assignments (hand-ins), and two written, closed-book, exams per course. I prepared the lessons, the homework assignments, the exams, and the re-exams by myself. I did all the grading by myself. Passing these written exams was prerequisite for access to the major written and oral final examination of the course. I took part as one of the examiners, for each course, in the final oral examinations and the grading.

During that period, I developed specialized courses for students in the Master of Science program, e.g., courses in Computational Linguistics, Language Processing, and Computational Semantics. The curricula, the course materials, the lectures, and the examinations in these courses were prepared and done by myself.

Regularly, I took part in the entrance examinations for Sofia University, and in the final, graduate exams for the Bachelor and Master's programs in Mathematics and Computer Science.

Teaching at the Department of Mathematics, Indiana University, Bloomington, IN, U.S., 1997–1998: I taught the courses

- Finite Mathematics
- Mathematics and Logic for Cognitive Science

During the terms of 1997-98 school year, I taught a course *Finite Mathematics*, which is one of the courses provided by the department for students majoring in different subjects. The classes consisted of 60-100 students. I prepared the lectures, homework assignments, and the examinations by following the standard curriculum and course materials established at the department.

Together with Jon Barwise, we developed the first offerings of the course *Mathematics and Logic for Cognitive Science*, in 1998. We used the following courseware books with software packages

- *Turing's World*. Dave Barker-Plummer, Jon Barwise, and John Etchemendy
- *Language, Proof and Logic: Tarski's World, Fitch, Boole*. Dave Barker-Plummer, Jon Barwise, and John Etchemendy (<https://www.gradegrinder.net>)

The course consisted of lectures and computer labs. We assigned reading course materials, i.e., chapters from the course materials, in advance of the lectures on the topics. Instead of traditional lecturing, we used the lecture times for discussions on topics leaded by questions from students.

Teaching at the Department of Computer Science, Indiana University, Bloomington, IN, U.S., 1998–1999: During the terms of 1998-99 school year, I was an instructor in the standard courses established at the department: Introduction to Computer Science, Discrete Mathematics,

and Theory of Computing. The teaching consisted of 4 hours lectures and 4 hours practical tutoring, typically in 14 weeks terms. I was responsible for the practical tutorials and followed the recommendations of the senior lecturers in charge of the courses. I gave the homework assignments, and did the grading, including of final examinations.

Teaching at the Linguistics Program, University of Minnesota, Minneapolis, U.S.: I taught the following courses:

- Computational Linguistics

The course was concentrated on contemporary approaches for grammar development, and consisted of two parts, computational syntax and semantics of natural languages, respectively:

A-1 Computational Syntax

A-2 Computational Semantics

(a) Logic

(b) Methods of Formal Logic for Computational Semantics

The lectures on syntax presented the constrained-based, lexicalist approaches to grammar theory and the formal tools of feature-valued structures and unification. The part on semantics was an introduction to logic and formal logic methods. I used computer lab with the courseware Language, Proof, and Logic (LPL). In the course, I used three textbooks:

1. Sag I. A. and T. Wasow. 1999. *Syntactic Theory. A formal Introduction*. CSLI Lecture Notes. N. 92. Stanford: CSLI Publications.
2. De Swart, H. 1998. *Introduction to Natural Language semantics*. Stanford: CSLI Publications.
3. *Language, Proof and Logic: Tarski's World, Fitch, Boole*. Dave Barker-Plummer, Jon Barwise, and John Etchemendy (<https://www.gradegrinder.net>)

- Topics in Computational Syntax and Semantics, with emphasis on Computational Semantics

The curricula, the course materials, the lectures, the computer labs, and the examinations in these courses were prepared and done by myself.

The seminar *Topics in Computational Syntax and Semantics* was for advanced graduate, post-graduate students, and researchers, with about 10 participants. I prepared and presented the lectures.

Teaching at the Department of Mathematics and Computer Science, Illinois Wesleyan University, Bloomington, IL, U.S.:

- Introduction to Computer Science
- Calculus I
- Calculus II
- Finite Mathematics

For the courses *Introduction to Computer Science*, *Calculus I*, and *Calculus II*, I prepared the lectures, homework assignments, and the examinations (two mid-term exams, a final exam, and re-exams) by following the standard curricula and course materials established at the department. I had the possibility to follow my own teaching methods, but I also followed advises from colleagues who were experienced in the courses. In the courses *Calculus I* and *Calculus II*, I lectured by following students' questions on reading assignments prior to lecture. In the times for practice on problems, I formed small working groups of 2-3 students, and interactively, I joined their work on problems.

I developed the course *Finite Mathematics* by myself following advises from the head of the department. I prepared course materials, lectures, written-homework assignments, two mid-terms, a final exam, and re-exams, by myself.

Teaching at Uppsala University, Sweden: Between February 2002 – May 2010, I was employed as University lecturer in Computational Linguistics, at the Department of Linguistics and Philology. Uppsala University, Uppsala, Sweden.

I taught courses in the areas of Computational Linguistics and related subjects. I was responsible for the administration, kursansvarig, of the courses. I developed and delivered lectures and computer labs by myself, and maintained the course websites.

- Foundations of Computer Science I
- Foundations of Computer Science II
- Computational Grammar I
- Computational Grammar II
- Computational Semantics
- Algorithms for Computational Semantics I
- Algorithms for Computational Semantics II
- Applied Automata Theory for Computational Linguists
- Algorithms and Data Structures in Object Oriented Programming
- Information Retrieval
- Mathematical Linguistics
- Formal Syntax
- Introduction to Natural Language Processing for IT / Computer Scientists

The curricula, the course materials, the lectures, the computer labs, and the examinations (with few exceptions of help grading of homework assignments, by assistants) in these courses were prepared and done by myself. I gave written-homework assignments (hand-ins), one per topic, usually one per week. The examinations usually consisted of a written mid-terms and a final examination. In the more advanced course, Algorithms for Computational Semantics II, examination involved a course projects. Students could work on their homework assignments in groups of two students, but I required that every student had individual submission, including a report on the details of collaboration. For the parts on Logic of the course *Foundations of Computer Science*, and partly in the course *Computational Semantics*, I used the Computerised Package *Language, Proof, and Logic*, including all of its software, for homework assignments and examinations. For the course *Applied Automata Theory for Computational Linguists*, I used:

JFLAP: An Interactive Formal Languages and Automata Package

(<https://www.jflap.org>) / (<https://www2.cs.duke.edu/csed/jflap/>) Accessed 2024 July 30

In addition to the help for the software packages, I used to provide help instructions for their study and completing assignments. I provided help during computer labs, office hours, and under requests from students, sometimes via Internet. After grading, depending on the occasions as appropriate, I requested students to re-submit corrected or improved assignments, by following suggestions and hints given by me on their works. By my experience, this helps their learning with understanding.

For the courses *Formal Syntax*, *Computational Grammar I*, and *Computational Grammar II*, I developed course lectures, course labs, homework assignments, and examinations by myself. For the computer assignments, I used the grammar tool LKB:

(<https://github.com/delph-in/docs/wiki/LkbTop>) Accessed 2024 July 30

8.3 Distance Teaching

I have experience in teaching distance courses by classic methods (in written correspondence) and over the Internet, including by using computerized courseware.

1. *Foundations of Computer Science* (Combining class-room settings and on-line teaching)
Between 1999-2001 I taught this subject as a distance course given by Indiana University, Bloomington, US, for students living in different locations, including abroad. While the method of teaching was based on distant learning, written homework assignments, written midterms,

and final examinations, I used a method developed by myself, by following general recommendations for the curriculum. In particular, I gave specialized selections of assignments and provided students with feedback, by prompted them to work on better solutions. Supervision included weekly instruction and consultations over telephone. Such supervision required vigilance and alertness from the teacher, according to my experience.

2. *Formal and Computational Grammar*, combining class-room settings and on-line teaching: Department of Linguistics and Philology, Uppsala University, Uppsala, Sweden
The curricula, the lectures, and the examinations in these courses were prepared and done by myself.
3. *Applied Automata Theory for Computational Linguists*, combining class-room settings and on-line teaching: Department of Linguistics and Philology, Uppsala University, Uppsala, Sweden
After several years of teaching by combining class-room and on-line methods, the course was developed as fully distance teaching, via the Internet, in 2008. An important ingredient of the on-line teaching is using software packages, such as LPL, grammar and automata software.
4. *Computational Semantics*, combining class-room and on-line teaching: Department of Linguistics and Philology, Uppsala University, Uppsala, Sweden
The curricula, the lectures, and the examinations in these courses were prepared and done by myself. This is a major topic of my teaching and research work. It is open for curriculum, course material and software development.
5. *Information Retrieval*: Department of Linguistics and Philology, Uppsala University, Uppsala, Sweden

In 2003, Spring term, I organised participation of Uppsala University in a virtual course on Information Retrieval, developed by an educational project with EU funding, at München, Tilburg, and Tübingen, hosted by Tübingen, Germany. I organised a group of students at Uppsala University for the course, applied for and obtained financing of the course by an EU project in Germany. I proctored and helped the students from Uppsala on their course assignments, study and handling the on-line material, and their work on final course papers and the final examination presentations. The students presented their final course projects at a conference in Tübingen, Germany (May 2003), for which I applied for and received funding from the German EU course project for the Uppsala University students, including support of a student for the travel of her baby and baby-care.

8.4 Experience with Software Packages in Courses

- Theorem Provers, extensive experience, e.g., with:
 - the automated proof checking system MIZAR
 - the PVS Specification and Verification System (SRI Int.) — a specification language integrated with support tools and a theorem prover
 - Fitch — Natural Deduction proof assistant for First Order Logic; Logical Reasoning with Diagrams and Sentences (LRDS) (<https://www.gradgrinder.net>)
- Model Checkers, extensive experience, e.g.:
 - SMV System
 - Tarski's World, for First Order Logic (<https://www.gradgrinder.net>)
- Large-scale grammars of human languages, e.g.:
 - LKB, CSLI LinGO Project
I have extensive experience with LKB.
Stanford University, Center for the Study of Language and Information (CSLI) (<https://github.com/delph-in/docs/wiki/LkbTop>) Accessed 2024 July 30
 - *HPSG TRALE*, a grammar development system for Head-Driven Phrase Structure (HPSG)

- (<https://hpsg.hu-berlin.de/Software/>) Accessed 2024 July 30
- Chalmers *GF*, *Gramatical Framework* (<https://www.grammaticalframework.org/>) as a part of my research and course projects on foundations of generalized CBLG and type-theoretic grammar of human languages
- Software and courseware packages, with which I have extensive experience:
 - *Language, Proof and Logic: Tarski's World, Fitch, Boole*, (LPL) by Dave Barker-Plummer, Jon Barwise, and John Etchemendy (<https://www.gradgrinder.net>) at CSLI Publications, Stanford: (<https://web.stanford.edu/group/cslipublications/cslipublications/site/9781575866321.shtml>)
 - Logical Reasoning with Diagrams and Sentences (LRDS), by Dave Barker-Plummer, Jon Barwise, and John Etchemendy and the advanced natural deduction software Hyperproof (<https://www.gradgrinder.net/Products/lrds-index.html>)
 - Formal Grammars and Automata Software packages, e.g.:
 - * *Turing's World*. Dave Barker-Plummer, Jon Barwise, and John Etchemendy
 - * *JFLAP: An Interactive Formal Languages and Automata Package* (<https://www.jflap.org>) / (<https://www2.cs.duke.edu/csed/jflap/>) Accessed 2024 July 30
 - * Finite State Technology of XEROX

9 Experience as a Supervisor

9.1 Supervision of Bachelor and Master's Theses

- Over years of teaching, I have supervised many course projects at basic, intermediate, and advanced levels (it's impossible for me to count them now).
- At the Faculty of Mathematics and Informatics, Sofia University, I taught upper level, specialized courses for theses. I supervised Master's (M.Sc.) theses in informatics and computational linguistics. E.g., a student completed his M.Sc. thesis on implementation of the situation semantics analysis developed in my Ph.D. dissertation.
- Supervisor of Bachelor of Science (BSc) thesis in Mathematics, Department of Mathematics, Stockholm University, Sweden

Title: *Montague's Intensional Logic for Computational Semantics of Human Language*. Student: Axel Ljungström, 2018:K16¹

<https://www.math.su.se/publikationer/uppsatsarkiv/tidigare-examensarbeten-i-matematik/kandidatarbeten-matematik-2018-1.371073>

9.2 Supervision of Ph.D. Students

At Sofia University, where I was on a full-time faculty post, a Ph.D. student developed a Prolog system, as a part of the Ph.D. dissertation, on education in mathematics for children, which used situational structures, similar to the ones in my Ph.D. dissertation. I was an additional adviser for the development of the system.

In the Autumn 2014, I supervised PhD students of the Department of Mathematics, Stockholm University, on their project work on the Chalmers GF, Gramatical Framework (<http://www.grammaticalframework.org>).

¹Copy-paste long URL addresses may add some empty space at the point of line breaks, which has to be removed in the URL address slot of a browser.

9.3 Work as a Supervisor — Approach

I familiarize myself with the educational background of the students. In meetings with students, we discuss their interests for topics, their preferences for work on theses, and directions they may pursue in education, profession, and future careers. We choose the subjects, topics, the titles, the tasks, and make plans for work. We set initial bibliographical references, by keeping the lists open for extending, and schedules for work and meetings.

9.4 Participation in Evaluation Committees of M.Sc. and Ph.D. Theses

- During my work at Sofia University, Bulgaria, I served many times as a reviewer of M.Sc. theses and Ph.D. dissertations of students specializing in mathematical logic, computational linguistics, and computer science.
 - Twice as an opponent and member of examination committees of Ph.D. theses (betygsnämnd i Ph.D. disputation) at the Department of Information Technology, Uppsala University, Sweden. For example, in the Ph.D. disputation of Lisa Kaati. (She was hired as a researcher in Totalförsvarets forskningsinstitut (FOI), for her dissertation on automata theory.)
 - an opponent and member of the examination committee of the Ph.D. theses, at School of Computer Science and Communication (CSC), at KTH Royal Institute of Technology in Stockholm
 - (1) Marc Vinyals, the title of the thesis: “Space in Proof Complexity” (9 June 2017)
 - (2) Susanna F. de Rezende, the title of the thesis: “Lower Bounds and Trade-offs in Proof Complexity” (14 June 2019)
- (<http://kth.diva-portal.org/smash/record.jsf?pid=diva2%3A1318061&dswid=7905>)

10 Training in Teaching and Learning in Higher Education

- By continuous work in the educational system of the Faculty of Mathematics and Informatics, Sofia University, Sofia, Bulgaria
- By extensive and continuous teaching work at international universities
- A course *Teaching Computer Science* taken at the Department of Computer Science, Indiana University, Bloomington, IN, US; September 1999 - December 2000
- *International Teacher Training Course* at Uppsala University, Uppsala, Sweden (required for University Lecturers), March 27 – June 8 2006. The certificate is enclosed
- Publications on pedagogy
 - (1) Loukanova, R.: *Teaching with the Computerised Package Language, Proof, and Logic (LPL)* In: Boute, R and J.N. Oliveira (Eds.). *Formal Methods in the Teaching Lab*. Formal Methods 2006 Symposium McMaster University, Ontario, Canada. Workshop preprints. pp. 101–110.
(https://www.academia.edu/24505627/Formal_Methods_in_the_Teaching_Lab_Examples_Cases_Assignments_and_Projects_Enhancing_Formal_Methods_Education)
 - (2) Loukanova, R.: *Teaching Formal Methods for Computational Linguistics at Uppsala University*. In: P. Boca, J.P. Bowen, D.A. Duce (Eds.). *Teaching Formal Methods: Practice and Experience*. 15 December 2006. Oxford Brookes University and BCS-FACS. Proceedings, pp. 57–62. DOI: 10.14236/ewic/TFM2006.11
(<https://doi.org/10.14236/ewic/TFM2006.11>)

11 Course Development and Course Administration

11.1 Pedagogic Work

For some publications on pedagogic and teaching materials, see the List of my Publications.

Interdisciplinary Educational Program I have been working on development of an interdisciplinary educational program in *Computational Sciences, with specialisation in Computational Linguistics*, for Bachelor, Master, and Ph.D. (doctoral) degrees. Upon request, I can provide the draft of the program.

Teaching

- Teaching at all levels of undergraduate, graduate, and postgraduate programs
- Development of courses on specialized topics and in interdisciplinary areas
- Seminars for researchers working in interdisciplinary areas

11.2 Course Administration and Management

I prepare course curricula, descriptions, assignments, and examinations. I deliver courses and maintain their websites with relevant information. I keep up Internet communications with students for the courses, by agreeing on course regulations and ethics, with colleagues and students.

I was responsible for the administration of the courses taught by me, e.g., at Uppsala University. I developed and delivered lectures and computer labs by myself, and maintained the course websites.

Collaboration within the Education Programme For smooth work on teaching within the education program, it is necessary to coordinate all relevant aspects, e.g.:

- existing courses
- introduction of new courses or subjects in courses and supervision
- teaching in general and in particular subjects
- course dependencies, where material in some courses is dependent on prior knowledge, e.g., in existing or by introduction of new topics
- new tendencies in research, which are important to be reflected in education program
- collaboration on teaching between courses within the department, departments within the institution, local universities, and upward at national and international stage and levels
- collaboration between academic, industrial, and other commerce institutions
- continuous reflection, with updates, of strategically important areas on education program
- development of new education programs

12 Other Activities Related to Teaching

Pedagogical Activities outside the University I participated in the educational program in Mathematical Linguistics for high school students, for the Bulgarian National Olympic Competitions. The program was organized and sponsored by the Ministry of Sciences and High Education, Bulgaria. I taught in the summer schools of the program, and the Ministry published my teaching materials.

13 Reflections on my own Teaching Work

13.1 Teaching Methods in the Context of Technology

My ideas about teaching are expressed to certain extend in my papers on pedagogy. Combination of different techniques and technologies, esp. by using computerized packages, in teaching, course assignments, and grading, is essential for learning and understanding course material, in general. Course materials, lectures, and supervision, when supported with computerized systems, at all levels, enhance comprehension of theoretical backgrounds such as mathematical foundations of computer sciences, computational models of information and information exchange, theories of algorithms, implementation dependencies, constraints, variations, etc.

The level of presentation and course materials should be consistent with the level of the course. For example, formal systems and theories, when they are background to the major course material, may be given at the level of supporting ideas and intuitions, in a pertinent style. On the other side, when relevant, theory should be presented in a more comprehensive style, e.g., with formal proofs, in a mathematical style. Assignments and demonstrations with software provide engagement, learning feedback and enhancement.

Computerized teaching is an excellent way to prepare students for the contemporary professional environments with growing technologies. It provides students with problem solving skills, creativity, and abilities for efficiency in work. Importantly, they get trained for attainments in computer-user interactions with new technologies (incl. in new, challenging, unpredictable environments), as non-professional and professional users, e.g., future scientists, developers in technological areas, and other professionals. In particular, computerized course materials provide students with:

- practical experience with subject topics
- skills for real life tasks
- specialized professional skills in technologies
- background and knowledge for academic careers and scientific research

Computerized courseware packages provide possibilities for far more course assignments than in traditional teaching. Students have the possibility to improve their solutions of tasks and they readily take that up, which promotes learning and understanding of the material. On-line work by advanced software and automatic checking of solutions, gives the students enhanced and flexible possibilities for individual work, provides them with learning feedback for self-evaluation of progress, in proper and fare style. Computerized courseware facilitates the education, primarily from the perspective of students, as learners. From the side of the lecturer, computerized teaching provides valuable feedback on the course work by students, their learning progress and knowledge achievement, in a far more comprehensive way than traditional teaching.

13.2 Reflection on Pedagogy and Teaching

I have extensive experience with students who worked on course assignments and projects, in groups or individually. I have used various methods, many forms of advise and help based on individual cases, in classes, in office hours, and on-line.

That experience has taught me to respect students with divergent background, and different standing, and to provide directions, advise, help, and encouragement as needed.

Teaching work in all forms (in-class lecturing, computer labs, on-line course work, discussions with students, in groups and individually, in class and open-office) has given me invaluable feedback.

For some publications on pedagogic and teaching materials, see my List of Publications.

Part V

Grants, Projects

Research funds: Predominantly, since 2009, up to September 30, 2014, I maintained my research work as an Independent Researcher. From 1 October 01, 2014 to May 2018, my research was supported by the Department of Mathematics and by the Department of Philosophy, Stockholm University, Sweden.

11 October 2021 – 10 October 2025 Project: COST Action

European Research Network on Formal Proofs (EuroProofNet) CA20111

<https://www.cost.eu/actions/CA20111/>

<https://europroofnet.github.io>

The main proposer is Frédéric Blanqui. I'm a secondary proposer, together with colleagues from other countries. I'm happily proud that I am:

- elected as a member of the Management Committee (MC) of EuroProofNet
- elected as (1) the vice-leader and (2) the leader from 18 Oct 2024, of WG6: Type Theory
- assigned in the following Working Groups (WGs) of EuroProofNet:
 - WG1: Tools for Proof Systems Interoperability (proposer, member)
 - WG2: Automated Theorem Provers (proposer, member)
 - WG3: Program Verification (proposer, member)
 - WG6: Type Theory (proposer, member, leader)

In the Past:

- 1986 – 1991: Grant by an exchange program between Bulgarian Ministry of Education and Moscow State University (MGU), Moscow, USSR, for Ph.D. program in Mathematics: 1986 – 1991 at: Department of Discrete Mathematics, Faculty of Mechanics and Mathematics, Moscow State University (MGU), Moscow, USSR — current Russia
- Over the years at Sofia University, participation in research projects in the areas of logic, computability, and computational linguistics, by research contracts between the Bulgarian Ministry of Sciences and Higher Education, The Institute of Mathematics and Informatics of Bulgarian Academy of Sciences, and the Department of Mathematical Logic, Faculty of Mathematics and Informatics, Sofia University
- Research on Computational Semantics as part of my PhD research program, supported by a grant from the Norwegian Research Council for Science and Humanities, Oct 1989 – Apr 1990
- A Tempus grant for a project on Computational Semantics, 1994
- A travel grant from Vetenskapsrådet, Swedish Research Council, NT, Sweden, for participation in *Theoretical Aspects of Computing — ICTAC 2007*
- partial grant towards travel and accommodation expenses from:
 - University of Göttingen, Germany
 - Visiting research fellow at the Department of English Linguistics, May 2008
 - The result was a research paper on syntax-semantics interface in CBLG by using the language of acyclic recursion.
- partial grant towards travel and accommodation expenses from:
 - Tilburg Center for Logic and Philosophy of Science (TiLPS), Tilburg University
 - Visiting research fellow at TiLPS, Sep – Dec 2008
 - The result was a publication and participation in a conference — ForLing 2008 — and work on research project on Computational Semantics for natural and artificial languages. In parallel, I taught and conducted work on distance teaching on formal methods and theoretical foundations of computer science.

- Grant towards travel expenses for participation in AAIA'15: 6636 SEK 48 öre
from: Department of Mathematics, Stockholm University, Stockholm, Sweden
towards expenses for participation at:
10th International Symposium Advances in Artificial Intelligence and Applications (AAIA'15)
Lodz, Poland, 13-17 Sep 2015 (<https://fedcsis.org/2015/aaia.html>)
- Grant towards travel expenses for participation in AAIA'17: 8042 SEK 21 öre
from: Department of Philosophy, Stockholm University, Stockholm, Sweden
towards expenses for participation at:
International Symposium Advances in Artificial Intelligence and Applications (AAIA'17),
Prague, Czech Republic, 3 – 6 September, 2017 (<https://fedcsis.org/2017/aaia>)
- Grant towards travel expenses for participation in AAIA'18 / AIRIM'18
3rd International Workshop on AI aspects of Reasoning, Information, and Memory (AIRIM'18)
Poznań, Poland, 9 - 12 September, 2018 (<https://fedcsis.org/2018/airim>)
granted:
 - (1) by FedCSIS: registration fee waiver, for chairing AIRIM'18 (550 euros)
 - (2) by the Adam Mickiewicz University:
 - accommodation
 - daily food coverage: 200 Polish Zloty (equivalent to approx 500 SEK)
 - local transport in Poznań
- Grants towards travel expenses for participation in the International Conference on Agents and Artificial Intelligence, ICAART (<https://icaart.scitevents.org>):
 - (1) $3 \times 595 = 1785$ euro
INSTICC, The Institute for Systems and Technologies of Information, Control and Communication (<https://portal.insticc.org>)
grants equivalent to waiving regular participation fees for ICAART 2015, ICAART 2018, ICAART 2019
 - (2) 6228 SEK 93 öre (approximately 623 euro)
towards travel expenses for participation in ICAART 2015
from: Department of Mathematics, Stockholm University, Stockholm, Sweden
 - (3) 6812 SEK 47 öre
towards travel expenses for participation in ICAART 2018:
from: Department of Philosophy, Stockholm University, Stockholm, Sweden
- 71 000 SEK
from: Vetenskapsrådet (<https://www.vr.se>) konferensbidrag
Diarienummer: 2017-00571 Project title: Workshop om logik och algoritmer i datorlingvistik 2017 (LACompLing17)
Project leader: Roussanka Loukanova Date of the award: 2017-06-13
- Grants towards travel expenses for participation in:
Symposium *Possible Worlds: Problems and Prospects* at the Ninth European Congress of Analytic Philosophy (ECAP9), 21-26 August 2017, Munich
 - (1) 600 euro (6091 SEK 63 öre)
from: Ludwig-Maximilians-Universität (LMU) München
 - (2) 2635 SEK 1 öre (approximately 263 euro)
from: Department of Philosophy, Stockholm University, Stockholm, Sweden
- 2000 euro
fellow of the Logic Group, Department of Mathematics, Stockholm University, Sweden
a grant on the project CORCON
towards expenses for research visiting, December 2017, at:
Department of Mathematics and Statistics, University of Canterbury, Christchurch, New Zealand
- 2000 euro

fellow of the Logic Group, Department of Mathematics, Stockholm University, Sweden
a grant on the project:
Computing with Infinite Data (CID)
towards expenses for research visiting, March 2018, at:
School of Information Science, Japan Advanced Institute of Science and Technology (JAIST),
Nomi, Japan (<https://www.jaist.ac.jp/is/labs/ishihara-lab/www/english/index.html>)

INGRACOMLEN: Project, 2016 – 2018

Project Title: Algoritmos de inferencia gramatical para medir la complejidad relativa de las lenguas naturales (Grammatical Inference Algorithms for measuring the relative complexity of natural languages) INGRACOMLEN

Financial Entity: Ministerio de Economía y Competitividad, Spain

Duration: From 01/01/2016 to 31/12/2018

Participant Universities: Universitat Rovira i Virgili, Jean Monnet University, Roskilde University, Stockholm University

Number of Researchers: 8

Scientist in Charge: M. Dolores Jiménez López

URL: <https://ingracomlen.wordpress.com>

Funding: 28400 euro, designated for project meetings and conferences

Funding to me, for my participation:

- paid flights, hotel, buses, taxi (between Uppsala and Arlanda Airport, Stockholm) towards expenses for a project meeting at:
Universitat Rovira i Virgili, Tarragona, Spain, 26-29 November 2016
- paid flights, hotel, registration fees of two full papers towards expenses for participation and presentation at:
15th International Conference on Distributed Computing and Artificial Intelligence (<https://www.dcai-conference.net>)
- paid flights, hotel; reimbursed 90 euro 95 cents: for buses, taxi (between shuttle-bus stops and residence, accommodation), towards expenses for a project meeting at:
Universitat Rovira i Virgili, Tarragona, Spain, 17-19 December 2018

Education Grants

- 2003, Spring term: Grant by Tübingen Linguistics Department, Germany, for participation as a lecturer, together with six students from Computational Linguistics at Uppsala University, in a virtual course on Information Retrieval, developed by an educational project with EU funding, at München, Tilburg, and Tübingen, hosted by Tübingen, Germany. The grant included full travel expenses for the students and me, for participation in a course conference at Tübingen Linguistics Department, Germany.

Part VI

Scholarly Activities

14 Scientific Organizations, Committees, Talks

14.1 Organization Committees, Chair

- 8–19 September 2025, EuroProofNet Symposium, Institut Pascal, Orsay, France
<https://europroofnet.github.io/Symposium/>

- 8–11 September 2025: International School on Logical Frameworks and Proof Systems Interoperability (LFPSI) <https://europroofnet.github.io/LFPSI25/>
- 11–14 September 2025: WG2: Workshop on Automated Reasoning and Proof Logging <https://europroofnet.github.io/wg2-symposium/>
- 15–16 September 2025: WG4: Workshop on Proof Libraries https://europroofnet.github.io/WG4_Orsay25/
- 15–18 September 2025: MCLP: International Conference on Mathematical and Computational Linguistics for Proofs (MatCompLing for Proofs / MCLP) <https://europroofnet.github.io/MCLP/>
- 17–19 September 2025: WG3: Workshop on Program Verification <https://europroofnet.github.io/wg3-Sept2025/>
- The founder and a chair of the series of the Symposium *Logic and Algorithms in Computational Linguistics* (LACompLing)
 - Edition in 2025:
Mathematical and Computational Linguistics for Proofs (MathCompLingP / MCLP) Institut Pascal, 15–18 September 2025, funded by EuroProofNet.
<https://europroofnet.github.io/MCLP/>
 Part of two weeks Symposium EuroProofNet of COST Action *European Research Network on Formal Proofs (EuroProofNet)*
[\(https://europroofnet.github.io/Symposium/\)](https://europroofnet.github.io/Symposium/)
 - Symposium *Logic and Algorithms in Computational Linguistics* 2021 (LACompLing2021): part of a week on *Mathematical Linguistics* (MALIN) 2021, Montpellier, 13–17 December 2021, online streaming by Université de Montpellier
[\(https://staff.math.su.se/rloukanova/LACompLing2021-web/\)](https://staff.math.su.se/rloukanova/LACompLing2021-web/)
 - Symposium *Logic and Algorithms in Computational Linguistics* 2018 (LACompLing2018), Stockholm, 28–31 August 2018, Departments of Mathematics and Philosophy, Stockholm University (<https://staff.math.su.se/rloukanova/LACompLing2018-web/>)
 - Workshop on *Logic and Algorithms in Computational Linguistics* 2017 (LACompLing17), Stockholm, August 26, 2017, Department of Mathematics, Stockholm University
[\(https://staff.math.su.se/rloukanova/LACompLing17.html\)](https://staff.math.su.se/rloukanova/LACompLing17.html)
- A general co-chair of the federated conferences of Mathematical Linguistics (MALIN) 2021, Montpellier, 13–17 December 2021
- The founder, chair, and co-organizer of a series of Special Session on Computational Linguistics, Information, Reasoning, and AI (CLIRAI) / (CompLingInfoReasAI) at the International Conference on Distributed Computing and Artificial Intelligence, DCAI (<https://www.dcai-conference.net>)
 Springer: <https://link.springer.com/conference/dcai>
 - CLIRAI'25 at DCAI'25, University of Lille (France), 27 June, 2025:
<https://www.dcai-conference.net/index.php/tracks/special-sessions/clirai>
<https://www.dcai-conference.net/programme/scientific-programme>
 - CLIRAI'24 at DCAI'24 University of Salamanca, Spain, 26th–28th June, 2024:
<https://link.springer.com/book/9783031764585#bibliographic-information>
 - CLIRAI'23 at DCAI'23 Guimarães, Portugal, 12–14 July 2023:
 DOI <https://doi.org/10.1007/978-3-031-38318-2>
 - CompLingInfoReasAI'22 at DCAI'22, PAAMS'22, L'Aquila, Italy - Hybrid, 13–15 July, 2022: DOI <https://doi.org/10.1007/978-3-031-23210-7>
 - CompLingInfoReasAI'21 at DCAI'21, Salamanca, Spain, within PAAMS'21, 6th–8th October, 2021. Chairing the presentation session of CompLingInfoReasAI'21 at DCAI'21: DOI <https://doi.org/10.1007/978-3-030-86887-1>

- Logic, Information, Language, Memory, Reasoning 2017 (LogInfoLangMR17), at the 14th International Conference on Distributed Computing and Artificial Intelligence 2017 (DCAI'17), Polytechnic of Porto, Porto (Portugal), 21st–23rd June, 2017
- The founder, organiser, and chair of:
 - Special Session on Natural Language Processing in Artificial Intelligence - NLPinAI, within the International Conference on Agents and Artificial Intelligence - ICAART
 - NLPinAI is a continuation of the series PUaNLP 2015–2017 at ICAART.
 - Large Language Models & Natural Language Processing in Artificial Intelligence - LLMaNPInAI 2024 — part of the main conference ICAART 2024, Rome, Italy, 24–26 February 2024. Technical Program: (<https://www.insticc.org/node/technicalprogram/ICAART/2024>)
 - Zoom co-chairing: ICAART24-3B: Oral Presentations: Large Language Models (LLMs) Sunday, February 25th 2024 09:00 - 10:30
 - NLPinAI 2023 within ICAART 2023, 22–24 February 2023 — Lisbon, Portugal (<https://icaart.scitevents.org/NLPinAI.aspx?y=2023>)
 - NLPinAI 2022, within ICAART 2022, 3–5 February 2022 (<https://icaart.scitevents.org/NLPinAI.aspx?y=2022>)
 - NLPinAI 2021, within ICAART 2021, 4–6 February 2021 (<https://icaart.scitevents.org/NLPinAI.aspx?y=2021>)
 - NLPinAI 2020, within ICAART 2020, 22–24 February 2020, Valletta, Malta (<https://icaart.scitevents.org/NLPinAI.aspx?y=2020>)
 - NLPinAI 2019, within ICAART 2019, 19–21 January 2019, Prague, Czech Republic (<https://icaart.scitevents.org/NLPinAI.aspx?y=2019>)
 - NLPinAI 2018 within ICAART 2018, 16–18 January, 2018 - Funchal, Madeira, Portugal (<https://icaart.scitevents.org/NLPinAI.aspx?y=2018>)
- The founder and a co-chair of: of Special Session on Partiality, Underspecification, and Natural Language Processing - PUaNLP at International Conference on Agents and Artificial Intelligence - ICAART
 - PUaNLP 2017 at ICAART 2017, Rome, Italy, 24–26 February, 2017 (<https://icaart.scitevents.org/?y=2017>)
 - PUaNLP 2016 at ICAART 2016, Rome, Italy, 24–26 February, 2016 (<https://icaart.scitevents.org/?y=2016>)
 - PUaNLP 2015 at ICAART 2015, Lisbon, Portugal, 10–12 January, 2015 (<https://icaart.scitevents.org/?y=2015>)
- The founder and a co-chair of:
 - Special Session on Natural Language and Argumentation 2020 (NLA'20) at the 17th International Conference on Distributed Computing and Artificial Intelligence — DCAI'20, ONLINE, 7th–9th October, 2020 (<https://www.dcai-conference.net>)
- The founding organizer and a co-chair of the International Workshop on AI aspects of Reasoning, Information, and Memory, (AIRIM) since 2016, AIRIM'16, AIRIM'17, AIRIM'18, continued by the International Workshop on AI aspects in Reasoning, Languages, and Computation (AIRLangComp) at the Federated Conference on Computer Science and Information Systems (<https://www.fedcsis.org>)
 - AIRLangComp'19, Leipzig, Germany, 1 - 4 September, 2019 (<https://www.fedcsis.org/2019/airlangcomp>)
 - AIRIM'18, Poznań, Poland, 9 - 12 September, 2018 (<https://www.fedcsis.org/2018/airim>)

- AIRIM’17, Prague, Czech Republic, 4 - 7 September, 2017
(<https://www.fedcsis.org/2017/airim>)
- AIRIM’16, Gdansk, Poland, 11 - 14 September, 2016
(<https://www.fedcsis.org/2016/airim>)
- A member of the local organization committees of
 - The third Nordic Logic Summer School 2017, Stockholm, 7-11 August, 2017
 - Logic Colloquium 2017, Stockholm, 14-20 August, 2017
 - Computer Science Logic, CSL’2017 — the annual conference of the European Association for Computer Science Logic (EACSL), Stockholm, August 20-24, 2017
- The organizer and a co-chair of the Special Session S2: Languages, Information, and Computational Intelligence — LangInfoCompInt 2015 at the IEEE Region 10 International Conference (IEEE TENCON 2015)

14.2 Reviewing and Member of Program Committees

14.2.1 Area Supervisory Committee

- Area Supervisory Committee | Track Program Committee | Program Committee for Federated conference on Computer Science and Information Systems — FedCSIS: International Symposium Advances in Artificial Intelligence and Applications (AAIA), FedCSIS - AAIA, 2017–2019
(<https://fedcsis.org/2017/aaia/committee>)

14.2.2 Program Committees

- Distributed Computing and Artificial Intelligence, Special Sessions I, 20th International Conference. Special Session on Computational Linguistics, Information, Reasoning, and AI (CLIRAI) / (CompLingInfoReasAI)
- The founder and chair of:
Special Session on Natural Language and Argumentation 2020 (NLA’20)
at the 17th International Conference on Distributed Computing and Artificial Intelligence — DCAI’20, 7th-9th October, 2020
- The founder and chair of ongoing:
Special Session on Natural Language Processing in Artificial Intelligence - NLPinAI, within the International Conference on Agents and Artificial Intelligence - ICAART
NLPinAI is a continuation of the series PUaNLP 2015–2017 at ICAART.
(<https://icaart.scitevents.org/NLPinAI.aspx?y=2023>)
- IEEE/WIC/ACM International Joint Conference on Web Intelligence and Intelligent Agent Technology (WI-IAT), since 2014
- International Conference on Brain Informatics (BI), since 2014
- International Symposium Advances in Artificial Intelligence and Applications AAIA, since 2015, at Federated conference on Computer Science and Information Systems — FedCSIS
(<https://fedcsis.org>)
- International Conference on Brain Informatics (BI 2019) — Brain Science meets Artificial Intelligence December 13–15, 2019, Haikou, Hainan, China
- Workshop on Linguistic Complexity and Natural Language Processing (LC&NLP). Workshop at the 27th International Conference on Computational Linguistics (COLING 2018). Santa Fe, New Mexico (U.S.), 25 August 2018.
- Workshop *Situations, Information, and Semantic Content*, Munich Center for Mathematical Philosophy (MCMP), LMU, Ludwig-Maximilians-Universität München 16-18 December, 2016
- Special session on Partiality, Underspecification, and Natural Language Processing - PUaNLP 2015–2017 at ICAART

- The IEEE Region 10 International Conference (TENCON 2015)

14.3 Talks, Presentations

- *Parametric Information via Type Theory of Acyclic Algorithms*.
https://europroofnet.github.io/_pages/WG3/Sept2025/Roussanka-parinfo-ttaa.pdf
17–19 September 2025. MCLP + WG3: Workshop on Program Verification:
<https://europroofnet.github.io/wg3-Sept2025/>
- *Pure versus Generalised Quantifiers*.
https://europroofnet.github.io/_pages/MCLP/slides-MCLP/Roussanka-mclp.pdf
15–18 September 2025. MCLP: International Conference on Mathematical and Computational Linguistics for Proofs (MatCompLing for Proofs / MCLP): <https://europroofnet.github.io/MCLP/>
- *Logging Information by Moschovakis Type-Theory of Algorithms*.
https://europroofnet.github.io/_pages/WG2/Symposium/slides/Roussanka-li-mtta.pdf
11–14 September 2025. WG2: Workshop on Automated Reasoning and Proof Logging:
<https://europroofnet.github.io/wg2-symposium/>
- *Coordination and Underspecification in Type Theory of Acyclic Recursion*.
<https://www.dcai-conference.net/programme/scientific-programme>
22nd International Conference on Distributed Computing and Artificial Intelligence (DCAI) 2025. University of Lille (France), 25th–27th June, 2025. <https://www.dcai-conference.net>
- *Type Theory of Acyclic and Cyclic Algorithms without Chain Memory*. Women in EuroProofNet 2025, University of Strathclyde, Glasgow, Scotland, 10 June, 2025.
<https://europroofnet.github.io/women-epn-2025/>
at TYPES 2025, 9–13 June 2025:
<https://msp.cis.strath.ac.uk/types2025/programme.html>
- *Approaches to Computational Grammar of Natural Language*. EuroProofNet School on Natural Formal Mathematics. Lipschitz-Saal at the Mathematics Centre in Bonn, Germany, June 3rd–5th 2025. <https://naproche.github.io/school/>
- *Algorithmic Syntax-Semantics with the Type Theory of Acyclic Algorithms*. Women in Formal Math and Women in EuroProofNet. Hausdorff Research Institute for Mathematics, Bonn, Germany July 6–7, 2024. (<https://europroofnet.github.io/women-epn-2024/>)
(<https://www.math.bas.bg/logic/loukanovarp/Roussanka-Loukanova-Bonn2024Jul6.pdf>)
- *Type-Theory of Algorithms with Chain-Free Memory*. 21st International Conference on Distributed Computing and Artificial Intelligence (DCAI) 2024 University of Salamanca, Spain, 26th–28th June, 2024. (<https://www.dcai-conference.net>)
- Roussanka Loukanova — *Semantics of Propositional Attitudes in Type-Theory of Algorithms*. Proof Systems for Mathematics and Verification. EPFL, Lausanne, Switzerland. June 14–15, 2024. (<https://proofs.swiss/ps/2024/>)
- Roussanka Loukanova — *Relations between let-Terms of Lambda-Calculus and where-Terms of Type-Theory of Recursion*. European Research Network on Formal Proofs (EuroProofNet) CA20111. WG6 Type Theory: WG6 meeting in Leuven, Belgium, 4–5 April 2024.
(<https://europroofnet.github.io/wg6-leuven/>)
(<https://europroofnet.github.io/wg6-leuven/programme/#loukanova>)
- Roussanka Loukanova — *Semantics of Propositional Attitudes in Type-Theory of Algorithms*. Seminar of Algebra and Logic. Institute of Mathematics and Informatics (IMI), Bulgarian Academy of Sciences (BAS). Nov 24, 2023.
(https://www.math.bas.bg/algebra/seminarAiL/2023/No18_2023_11_24_R_Loukanova/Abstract-Loukanova-propat-tta-2023-11-24.pdf)
- Roussanka Loukanova — *Semantics of Propositional Attitudes in Type-Theory of Algorithms*.

- 20th International Workshop of Logic and Engineering of Natural Language Semantics 20 (LENLS20). Hosted by The Association for Logic, Language and Information (FoLLI). 18–20 November, 2023. (<https://lenls.github.io/lenls20/#program>) (<https://lenls.github.io/lenls20/LENLS20OnlineProceedings.pdf>)
- Roussanka Loukanova — *Rendering Natural Language of Mathematical Texts into Formal Language* (Invited Talk) [slides on the website] (<https://europroofnet.github.io/cambridge-2023/#loukanova>)
 - Loukanova, Roussanka: *Logic Operators and Quantifiers in Type-Theory of Algorithms*. International Conference Logic and Engineering of Natural Language Semantics 19 (LENLS19). 19–20 November, 2022. Hosted by The Association for Logic, Language and Information (FoLLI). (<https://lenls.github.io/lenls19/>)
 - Loukanova, Roussanka: *Logic Operators and Quantifiers in Type-Theory of Algorithms*. (on extended work) at: Seminar of Algebra and Logic. Institute of Mathematics and Informatics (IMI), Bulgarian Academy of Sciences (BAS). Nov 25, 2022. (https://www.math.bas.bg/algebra/seminarAiL/2022/No27_2022_11_25_R_Loukanova/Algebra_Logika_seminar_25-11-2022.pdf)
 - *Algorithmic Dependent-Type Theory of Situated Information and Context Assessments*. 19th International Conference on Distributed Computing and Artificial Intelligence | L'Aquila (Italy), 13th–15th July, 2022. (pdf)
 - *Dependent-Type Theory of Situated Information with Context Assessments*. Seminar of Algebra and Logic, Department of Algebra and Logic, Institute of Mathematics and Informatics (IMI), Bulgarian Academy of Sciences (BAS), Bulgaria, 24 June 2022. (abstract) (slides at IMI, pdf) / (slides at SU, pdf)
 - *Restricted Quantification in New Type-Theory of Algorithms*. Seminar of Algebra and Logic, Department of Algebra and Logic, Institute of Mathematics and Informatics (IMI), Bulgarian Academy of Sciences (BAS), Bulgaria. 03 Dec 2021. (abstract) / (slides at IMI, pdf) / (slides at SU, pdf) (<https://www.math.bas.bg/algebra/seminarAiL/index2021.html>) (<https://www.math.bas.bg/algebra/seminarAiL/>)
 - *Reduction Calculus of Type-Theory of Acyclic Algorithms, Parts I–II*. Seminar of Algebra and Logic, Department of Algebra and Logic, Institute of Mathematics and Informatics (IMI), Bulgarian Academy of Sciences (BAS), Bulgaria. (abstract, 29 Jan 2021) / (abstract, 5 Feb 2021) (slides at IMI, BAS) (slides at SU pdf) (<https://www.math.bas.bg/algebra/seminarAiL/index2021.html>)
 - *Type-Theory of Parametric Algorithms*. 2020 Annual Report Session of the Department of Algebra and Logic, Institute of Mathematics and Informatics (IMI), Bulgarian Academy of Sciences (BAS), Bulgaria, 18 Dec 2020 (slides at IMI, pdf) / (slides at SU, pdf) (<https://www.math.bas.bg/algebra/seminarAiL/>)
 - *Type-Theory of Acyclic Algorithms for Semantics of Natural Languages*. 56th Linguistics Colloquium, Nov 26–28 2020 (<https://sites.google.com/view/lingcoll>) (pdf)
 - *Algorithmic Dependent-Type Theory of Situated Information*. 56th Linguistics Colloquium, Nov 26–28, 2020 (<https://sites.google.com/view/lingcoll>) (pdf)
 - *Type-Theory of Parametric Algorithms with Restricted Computations*. 17th International Conference on Distributed Computing and Artificial Intelligence — DCAI'20. 7th–9th October, 2020 L'Aquila, Italy, (<https://www.dcai-conference.net/>) (pdf)
 - *Algorithmic Eta-Reduction in Type-Theory of Acyclic Recursion*. ICAART 2020, 22–24 February 2020, Valletta, Malta (<https://icaart.scitevents.org/Abstract.aspx?idEvent=vY/cqtoX0JM=>)
 - *Type-Theory of Acyclic Recursion and its Reduction Calculus*. Institute of Mathematics and Informatics, Bulgarian Academy of Sciences, Bulgaria (https://www.math.bas.bg/algebra/seminarAiL/Algebra_Logika_seminar_30-08-

2019.pdf)

- *Computational Syntax-Semantics Interface with Type-Theory of Acyclic Recursion for Underspecified Semantics*. Computing Semantics with Types, Frames and Related Structures. Workshop at IWCS 2019. May 24th, 2019, University of Gothenburg, Sweden
(<https://sites.google.com/view/cstfrsworkshop/>)
- *Relations between Specified and Underspecified Quantification by Moschovakis Theory of Acyclic Recursion*. Logic, Language, and Mind Seminar, CLLAM, Department of Philosophy, Stockholm University. 15 March 2019
- *Type-Theory of Acyclic Algorithms with Generalised Immediate Terms*. 11th International Conference on Agents and Artificial Intelligence (ICAART 2019). Knowledge Representation and Reasoning. 19–21 January 2019, Prague, Czech Republic
(<https://icaart.scitevents.org/Abstract.aspx?idEvent=+cR5/GjpHzw=>)
(<https://icaart.scitevents.org/Home.aspx?y=2019>)
- *Formalisation of Situated Dependent-Type Theory with Underspecified Assessments*. Decision Economics. Designs, Models, and Techniques for Boundedly Rational Decisions. DCAI 2018. 20–23 June 2018, Toledo, Spain
- *Syntax-Semantics Interfaces of Modifiers*. Distributed Computing and Artificial Intelligence, 15th International Conference. DCAI 2018. Special Session on Complexity in Natural and Formal Languages (CNFL). 20–23 June 2018, Toledo, Spain
- *Type-theory of acyclic recursion and its calculi*. Second Workshop on Mathematical Logic and its Applications, 5–9 March 2018, Kanazawa, Japan
(<https://www.jaist.ac.jp/is/labs/ishihara-lab/mla2018/index.html>)
- *Gamma-star Reduction in the Type-theory of Acyclic Recursion*. 10th International Conference on Agents and Artificial Intelligence, ICAART 2018, 16–18 January, 2018 - Funchal, Madeira, Portugal (<https://icaart.scitevents.org/?y=2018>)
- *Moschovakis Acyclic Recursion and its Reduction Calculi*. Talk given at Mini-Symposium: CORCON 4 Dec17. Department of Mathematics and Statistics, University of Canterbury, Christchurch, New Zealand. 4 December 2017
- *Semantic Argument Slots in the Type-Theory of Acyclic Recursion and Syntax-Semantics Interfaces in CBLG*. at: Logic and Engineering of Natural Language Semantics 14 (LENLS 14) a workshop of the JSAI International Symposia on AI (isAI2017)
- Invited talk: *Algorithmic Concepts of Situated Information*. Symposium *Possible Worlds: Problems and Prospects* at the Ninth European Congress of Analytic Philosophy (ECAP9), 21-26 August 2017, Munich
- Invited talk: *Type Theory of Situated Information*, Workshop on Logic and Algorithms in Computational Linguistics 2017 (LACompLing17), Stockholm, August 26, 2017
(<https://staff.math.su.se/rloukanova/LACompLing17.html>)
- Contributed talk: *Type Theory of Restricted Algorithms and Neural Networks*. Logic Colloquium 2017, August 14-20 2017, Stockholm (<https://doi.org/10.1017/bsl.2018.13>)
- *Type Theory of Situated Algorithms (TToSitAlg)*. New Worlds of Computation (NWC 2017) and Journées Calculabilités 12-14 Apr 2017, Orléans, France
(<https://nwc2017-jcal.sciencesconf.org>)
(<https://nwc2017-jcal.sciencesconf.org/program.html>)
- Invited speaker to the workshop *Situations, Information, and Semantic Content*, Munich Center for Mathematical Philosophy (MCMP), LMU, Ludwig-Maximilians-Universität München, 16-18 December, 2016
- *Underspecified Quantification by the Theory of Acyclic Recursion*. International Conference on Practical Applications of Agents and Multi-Agent Systems, PAAMS 2016, Sevilla Spain, 1-3 June, 2016 (<https://paams.net/>)
- *A Formal Language of Type Theory of Situated Information*. 27th Nordic Congress of Mathematicians, Institut Mittag-Leffler, Stockholm, 16-20 March, 2016

- (<https://www.mittag-leffler.se/congress-2016>)
- *Reduction Calculi in Type Theory of Acyclic Recursion and Applications*. 27th Nordic Congress of Mathematicians, Institut Mittag-Leffler, Stockholm, 16-20 March, 2016
(<https://www.mittag-leffler.se/congress-2016>)
 - *A Formalization of Generalized Parameters in Situated Information*. Paper presentation at the Special Session on Partiality, Underspecification, and Natural Language Processing - PUaNL 2016, 8th ICAART 2016 (<https://icaart.scitevents.org/?y=2016>)
 - *Acyclic Recursion with Polymorphic Types and Underspecification*. Paper presentation at the 8th International Conference on Agents and Artificial Intelligence — ICAART 2016
(<https://icaart.scitevents.org/?y=2016>)
 - *Gamma-Reduction in Type Theory of Acyclic Recursion*. Talk at the Stockholm Logic Seminar, Department of Mathematics, Stockholm University. 2016, February 17
 - *Gamma-Reduction in Type Theory of Acyclic Recursion*. Talk at the Logic Seminar, Department of Mathematics, Indiana University, IU Bloomington (January 2016)
 - *Specification of Underspecified Quantifiers via Question-Answering by the Theory of Acyclic Recursion*. Flexible Query Answering Systems (FQAS) 2015, October 26–28, Cracow, Poland
 - *Representing Parametric Concepts with Situation Theory*. The 10th International Symposium Advances in Artificial Intelligence and Applications (AAIA'15), Lodz, Poland, 13–16 Sep 2015
(<https://fedcsis.org/2015/aaia-1.html>)
(https://fedcsis.org/2015/aaia_program.html)
 - Presentation *Underspecified Relations with a Formal Language of Situation Theory*. ICAART 2015, the 7th International Conference on Agents and Artificial Intelligence, Lisbon, Portugal, 10–12 January, 2015 (<https://icaart.scitevents.org/?y=2015>)
 - *Algorithmic Granularity with Constraints*. 2013 International Conference on Brain and Health Informatics (BHI 2013), Oct 29–31, 2013, Maebashi Terrsa, Maebashi-city, Japan
(https://wi-consortium.org/conferences/amtbi13/bhi/index.php?category=accepted_ws)
 - *Algorithmic Semantics for Processing Pronominal Verbal Phrases*. 10th International Conference on Flexible Query Answering Systems 2013 (FQAS 2013)
 - *Semantic Information with Type Theory of Acyclic Recursion*. Presentation at the 8th International Conference, AMT 2012, Macau, China, December 4–7, 2012.
slides at IMI, BAS (<https://www.math.bas.bg/logic/loukanovarp/present-amt12.pdf>)
 - *Algorithmic Semantics of Ambiguous Modifiers by the Type Theory of Acyclic Recursion*. Presentation at: 2011 IEEE/WIC/ACM International Conferences on Web Intelligence and Intelligent Agent Technology (WI-IAT 2012) Workshops. Natural Language Processing and Ontology Engineering (NLPOE 2012) 4–7 December 2012, Macau, China
 - *A Predicative Operator and Underspecification by the Type Theory of Acyclic Recursion*. Presentation. Constraint Solving and Language Processing (CSLP) workshop. 13–14 September 2012, LIFO, the Computer Science laboratory of the University of Orléans, France
(https://link.springer.com/chapter/10.1007/978-3-642-41578-4_7)
 - *Computational Syntax-Semantics Interface of Passive Forms with The Language of Acyclic Recursion*. TURING CENTENARY CONFERENCE: CiE 2012 - How the World Computes
 - *A New Perspective of Abstract Syntax with the Grammatical Framework GF*. Presentation at: Computability in Europe CiE 2011: Models of Computation in Context. Sofia, Bulgaria
(<https://cie2011.fmi.uni-sofia.bg>)
 - *Algorithmic Intensionality and Underspecification of Verb-Phrase Ellipsis*. An extended abstract presented at the 14th Congress of Logic, Methodology, and Philosophy of Science (CLMPS 2011) — Nancy, France, 19–26 July, 2011: Symposium: Hyperintension, intension, extension
slides at IMI, BAS (<https://www.math.bas.bg/logic/loukanovarp/present-clmps11.pdf>)
 - *Computational intension, denotation, and propositional intention in the languages of acyclic*

recursion. Presentation at: Logic Colloquium 2009, ASL

(<https://lc2009.fmi.uni-sofia.bg/contributedslides/Loukanova.pdf>)

(<https://doi.org/10.2178/bs1/1264433799>)

- *Formalisation of Intensionality as Algorithms*. (project outline) In: Harry Bunt. 2009. Proceedings of the Eight International Conference on Computational Semantics. Association for Computational Linguistics (ACL), Tilburg, The Netherlands. pp. 295–298. ACL Anthology. A Digital Archive of Research Papers in Computational Linguistics. (<https://aclanthology.org/W09-3731.pdf>)

14.4 Tutorials

- Tutorial *Higher-Order Situation Theory in Artificial Intelligence* at ICAART 2016, the 8th International Conference on Agents and Artificial Intelligence (<https://icaart.scitevents.org/Tutorials.aspx?y=2016>)

Part VII

Scientific Works

15 Work in Progress

- (1) *Some Higher-Order Logics for Type-Theoretic Semantics: TY2, TT2, and IL of Natural Language*. Draft, Preprint File at ResearchGate: https://www.researchgate.net/publication/237405252_Some_Higher-Order_Logics_for_Type-Theoretic_Semantics_TY2_TT2_and_IL_of_Natural_Language
- (2) *Type-Theory of Acyclic Algorithms for Syntax-Semantics Interfaces of Formal, Artificial, and Natural Languages*
- (3) *Algorithmic Dependent-Type Theory of Situated Information*
- (4) *Type Theory of Situated Information, its Dependent Types, and Syntax-Semantics Interfaces*

16 List of Publications

16.1 Publications in Journals or Book Chapters — Refereed

- (1) Loukanova, R.: *Semantics of Propositional Attitudes in Type-Theory of Algorithms*. In: Daisuke Bekki, Koji Mineshima, and Elin McCready (eds). Logic and Engineering of Natural Language Semantics. LENLS 2023. Lecture Notes in Computer Science, LNCS, Vol. 14569 pp. 260–284. 2024. Springer, Cham. DOI: https://doi.org/10.1007/978-3-031-60878-0_15
Print ISBN 978-3-031-60877-3 Online ISBN 978-3-031-60878-0
Revised Selected Papers, LENLS 2023 hosted by FoLLI
- (2) Loukanova, R.: *Logic Operators and Quantifiers in Type-Theory of Algorithms*. In: Daisuke Bekki, Koji Mineshima, and Elin McCready (eds). Logic and Engineering of Natural Language Semantics. LENLS 2022, Lecture Notes in Computer Science, LNCS, Vol. 14213 pp. 173–198. 2023. Springer, Cham. DOI: https://doi.org/10.1007/978-3-031-43977-3_11
Print ISBN 978-3-031-43976-6 Online ISBN 978-3-031-43977-3
Revised Selected Papers, LENLS 2022 hosted by FoLLI

- (3) Loukanova, R.: *Restricted Computations and Parameters in Type-Theory of Acyclic Recursion*. ADCAIJ: Advances in Distributed Computing and Artificial Intelligence Journal, 12(1) (2023), e29081. <https://doi.org/10.14201/adcaij.29081>
<https://revistas.usal.es/cinco/index.php/2255-2863/article/view/29081/29667>
- (4) Loukanova, R.: *Eta-Reduction in Type-Theory of Acyclic Recursion*. ADCAIJ: Advances in Distributed Computing and Artificial Intelligence Journal, 12(1) (2023), e29199. <https://doi.org/10.14201/adcaij.29199>
<https://revistas.usal.es/cinco/index.php/2255-2863/article/view/29199/29663>
- (5) Loukanova, R. *Currying Order and Restricted Algorithmic Beta-Conversion in Type Theory of Acyclic Recursion*. In: Pavel Materna and Bjørn Jespersen (eds). *Logically Speaking. A Festschrift for Marie Duží*. Tribute Series edited by Dov Gabbay. 2022. (Appeared in January 2023) Volume 49. pp. 285–310. College Publications. ISBN-10: 1848904193 ISBN-13: 978-1-84890-419-4 (<http://www.collegepublications.co.uk/tributes/?00049>)
preprint at ResearchGate: DOI: 10.13140/RG.2.2.34553.75365
(<https://doi.org/10.13140/RG.2.2.34553.75365>)
- (6) Loukanova, R.: *Type-Theory of Acyclic Algorithms for Models of Consecutive Binding of Functional Neuro-Receptors*. In: Grabowski A., Loukanova R., Schwarzweller C. (eds) *AI Aspects in Reasoning, Languages, and Computation*. Book series: *Studies in Computational Intelligence (SCI)*. 2020. Volume 889. pp. 1–48. Springer International Publishing. Cham. DOI: 10.1007/978-3-030-41425-2_1 (https://doi.org/10.1007/978-3-030-41425-2_1)
- (7) Loukanova, R.: *Gamma-Reduction in Type Theory of Acyclic Recursion*. *Fundamenta Informaticae*, Volume 170, no. 4, pp. 367–411, 2019. IOS Press. DOI: 10.3233/FI-2019-1867
(<https://doi.org/10.3233/FI-2019-1867>)
- (8) R. Loukanova. *Gamma-Star Canonical Forms in the Type-Theory of Acyclic Algorithms*. In: van den Herik J., Rocha A. (eds) *Agents and Artificial Intelligence. ICAART 2018. Lecture Notes in Computer Science*, book series LNAI. Volume 11352. 2019. pp. 383–407. Springer International Publishing, Cham. DOI: 10.1007/978-3-030-05453-3_18
(https://doi.org/10.1007/978-3-030-05453-3_18)
- (9) Loukanova, R.: *Partiality, Underspecification, Parameters and Natural Language*. In: H. Christiansen, M. D. Jiménez-López, R. Loukanova, L. S. Moss (Eds). *Partiality and Underspecification in Information, Languages, and Knowledge*. 2017. pp. 109–150. Cambridge Scholars Publishing. ISBN (13) 978-1-4438-7947-7; (10) 1-4438-7947-9
(<https://www.cambridgescholars.com/product/978-1-4438-7947-7>)
- (10) Loukanova, R.: *Typed Theory of Situated Information and its Application to Syntax-Semantics of Human Language*. In: H. Christiansen, M. D. Jiménez-López, R. Loukanova, L. S. Moss (Eds.). *Partiality and Underspecification in Information, Languages, and Knowledge*. 2017. pp. 151–188. Cambridge Scholars Publishing. ISBN (13) 978-1-4438-7947-7; (10) 1-4438-7947-9
(<https://www.cambridgescholars.com/product/978-1-4438-7947-7>)
- (11) Loukanova, R.: *An Approach to Functional Formal Models of Constraint-Based Lexicalist Grammar (CBLG)*. *Fundamenta Informaticae* — Volume 152, issue 4, 2017. pp. 341–372. IOS Press. ISSN 0169-2968 (P) 1875-8681 (E) DOI: 10.3233/FI-2017-1524
(<https://doi.org/10.3233/FI-2017-1524>)
- (12) Loukanova, R.: *Relationships between Specified and Underspecified Quantification by the Theory of Acyclic Recursion*. In: ADCAIJ: Advances in Distributed Computing and Artificial Intelligence Journal. Regular Issue Volume 5 N. 4, 2016. pp. 19–42. Salamanca University Press. ISSN 2255-2863 (<https://doi.org/10.14201/ADCAIJ2016541942>)

- (<https://revistas.usal.es/cinco/index.php/2255-2863/article/view/ADCAIJ2016541942/15949>)
- (13) Loukanova, R.: *Situation Theory, Situated Information, and Situated Agents*. In: Transactions on Computational Collective Intelligence XVII. Nguyen, N.T., Kowalczyk, R., Fred, A., Joaquim, F. (Eds.). Lecture Notes in Computer Science, Volume 8790, 2014, pp. 145-170. Springer, Berlin, Heidelberg. ISBN 978-3-662-44993-6 (https://doi.org/10.1007/978-3-662-44994-3_8)
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(<https://www.cambridgescholars.com/product/978-1-4438-1762-2>)
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16.2 Publications in Refereed Conference Proceedings

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- (41) Loukanova, R.: *Acyclic Recursion with Polymorphic Types and Underspecification*. In: Jaap van den Herik and Joaquim Filipe (Eds.). Proceedings of the 8th International Conference on Agents and Artificial Intelligence (ICAART 2016) — Volume 2, pp. 392–399. SciTePress — Science and Technology Publications, Lda. ISBN: 978-989-758-172-4 (<https://doi.org/10.5220/0005749003920399>)
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- (43) Loukanova, R.: *Representing Parametric Concepts with Situation Theory*. In: M. Ganzha, L. Maciaszek, M. Paprzycki (Eds.). 2015 Federated Conference on Computer Science and Information Systems, series Annals of Computer Science and Information Systems, Volume 5, pp. 89–100, 2015, DOI: 10.15439/2015F409 ISBN 978-83-60810-66-8 (Web) 978-83-60810-67-5 (USB) 978-83-60810-65-1 (ART) Publisher: IEEE (Digital) (<https://ieeexplore.ieee.org/document/7321430>) (<https://doi.org/10.15439/2015F409>) (https://annals-csis.org/Volume_5/pliks/409.pdf)
- (44) Loukanova, R.: *Underspecified Relations with a Formal Language of Situation Theory*. In: St. Loiseau et al. (Eds.). Proceedings of the 7th International Conference on Agents and Artificial Intelligence, Vol.1, 2015, pp. 298–309. SciTePress — Science and Technology Publications, Lda. ISBN 978-989-758-073-4 (<https://doi.org/10.5220/0005353402980309>)
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- (60) Loukanova, R.: *An Approach to Formal Models of Constrained Based Lexicalized Grammar*. In: Proceedings of International Workshop on Non-classical Formal Languages in Linguistics (ForLing) Budapest, August 31, 2007.
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- (62) Loukanova, R.: *Quantification and Intensionality in Situation Semantics*. In: Alexander Gelbukh (Ed.) Computational Linguistics and Intelligent Text Processing. CICLing 2002. Lecture Notes in Computer Science. Volume 2276. 2002. pp. 32–45. Springer-Verlag, Berlin, Heidelberg. Print ISBN 978-3-540-43219-7 Online ISBN 978-3-540-45715-2 (<https://dl.acm.org/doi/10.5555/647344.724149>) (https://doi.org/10.1007/3-540-45715-1_3)
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16.3 Books

- (72) Baynov, D., S. Kostadinov, R. Pavlov, R. Loukanova. *A book on tasks in Discrete Mathematics*. Plovdiv. 1990. (in Bulgarian)
- (73) Chimev, K., R. Pavlov, R. Loukanova. *A book on tasks in Discrete Mathematics*. HPI – Blagoevgrad. 1989. (in Bulgarian)

16.4 Publications on Pedagogy

- (1) Loukanova, R.: *Teaching with the Computerised Package Language, Proof, and Logic (LPL)* In: Boute, R and J.N. Oliveira (Eds.). *Formal Methods in the Teaching Lab*. Formal Methods 2006 Symposium McMaster University, Ontario, Canada. Workshop preprints. pp. 101–110.
(https://www.academia.edu/24505627/Formal_Methods_in_the_Teaching_Lab_Examples_Cases_Assignments_and_Projects_Enhancing_Formal_Methods_Education)
- (2) Loukanova, R.: *Teaching Formal Methods for Computational Linguistics at Uppsala University*. In: P. Boca, J.P. Bowen, D.A. Duce (Eds.). *Teaching Formal Methods: Practice and Experience*. 15 December 2006. Oxford Brookes University and BCS-FACS. Proceedings, pp. 57–62. DOI: 10.14236/ewic/TFM2006.11 (<https://doi.org/10.14236/ewic/TFM2006.11>)

16.5 Selected Teaching Materials

- (1) *First Order Logic: Syntax, Semantics, and Logic. Atomic Sentences, Boolean Connectives, Quantifiers*
Abstract: Introduction to First Order Logic (FOL): lectures developed by me and taught partly on-line, using the LPL courseware: Language, Proof and Logic: Tarski's World, Fitch, Boole, (LPL) by Dave Barker-Plummer, Jon Barwise, and John Etchemendy CSLI Publications, Stanford (<https://www.gradergrinder.net>)
File (1ec3-10-FOL-LPL-4up.pdf) at ResearchGate: DOI: 10.13140/RG.2.2.30778.88005 (<https://doi.org/10.13140/RG.2.2.30778.88005>)
- (2) *Computational Semantics. From Leibniz, Ongoing Passion for Life, Math and Computers*
Abstract: Initial Lecture Notes on Computational Semantics, in First Order Languages and Logic, and Foundations of Syntax-Semantics Interface
File (init-CompSem1.pdf) at ResearchGate: DOI: 10.13140/RG.2.2.24906.85444 (<https://doi.org/10.13140/RG.2.2.24906.85444>)
- (3) *Lecture Notes: Foundation of Computer Science, II*
Lecture Notes for courses covering topics on Introduction to Formal Languages, Grammars, and Automata Theory.
File (FoundCompSci2-07a.pdf) at ResearchGate:
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- (4) Lecture Notes for Advanced Computational Semantics: Logic Foundations of Montague Grammars Muskens' Relational Montague Grammar. Part I-II: The Logics TY2, TT2, and IL. Lectures on Advanced Computational Semantics
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- (6) *Logics for Linguistics*, a series of lectures and seminars (co-organiser and lecturer), see Part 2
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16.6 Editor

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