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Report on the Research Sabbatical Leave July–December 2003

Main Activities

1. July: Europe

- Visiting Professor, LE2I, Université de Bourgogne, Dijon, France, 1–15 July. Discussions with Professor V. Vajnovszki. Seminars: *Passages of Proof* and *What Is Turing Halting Problem?*
- Participation to the 4th International Conference “Discrete Mathematics and Theoretical Computer Science” (DMTCS’03), Dijon, France, 7–12 July.
- Visit to the Centre National de la Recherche Scientifique, Paris, France. Discussions and co-operation with Professor B. Nicolesco, 15–17 July.
- Visit to the Romanian Academy, Bucharest, Romania, 17–27 July. Discussions with Professor N. Dinculeanu (University of Florida, Gainesville, USA), Acad. M. Malita, Acad. S. Marcus. Co-operation with Acad. S. Marcus. Seminar: *Quantum Computing and Learning*.
- Member of the Examination Committee (as supervisor) for the defence of the Ph.D. Thesis “Contributions to Algorithmic Information Theory” by Cristian Grozea (chrisg@phobos.ro) at Bucharest University, Romania.
- Visit to the Mathematischen Institut der Ludwig-Maximilians-Universität München, Germany, 28–29 July. Discussions with Professor D.S. Bridges, Dr. P. Schuster, Professor H. Schwichtenberg, Dr. L. Viță. Seminar: *What Is Turing Halting Problem?*

2. August 1-5: Auckland

- Brief return to Auckland. CDMTCS Seminar: *Passages of Proof*. Co-operation with J.J. Arulanandham, Professor H. Carmichael, Dr. M.J. Dinneen, Dr. A. Nies, Professor B. Pavlov, C-K. Shu.

3. August 15-30: Chile

- Visiting Professor, Centre for Mathematical Modelling, Universidad de Chile, Santiago, Chile. Discussions with Professor F. Brieva (Dean of the Faculty of Physical and Mathematical Sciences), Professor E. Goles, Dr. A. Hart, Professor S. Martinez, Dr. I. Rapaport, Professor A. Toom (Universidad Federal de Pernambuco, Brasil). Seminars: *Computing a Glimpse of Randomness*, *What Is Turing Halting Problem?*, *An Introduction to Quantum Computing*.
- Visit to CONICYT (Chilean Commission for Scientific Research and Technology), Santiago, Chile. Discussions with Dr. J. Casti (Santa Fe Institute, Albuquerque, USA) and Dr. E. Coles (President of CONICYT).
- Member of the PhD Examiner Committee for the PhD Thesis “Partículas y Agentes Simples en Autómatas Celulares y otros Sistemas Discretos” by A. E. Moreira Wenzel, Universidad de Chile, Santiago, Chile.

4. September 1-15: Asia and Middle East

- Visit to the Computer Science Department of the Hong Kong University of Science & Technology, Hong Kong, 1–8 September. Discussions with Professor C. Ding. Seminar: *Paradoxes of Voting*.
- Visit to Effat College, Jeddah, Saudi Arabia, 9–15 September. Discussions with Dr. Betsy Espe, Vice-Dean, Dr. Annette Lagman, Head of the Computer Science and Information Systems Department, Professor Mahmoud A. Taha or Mohamed Abou Zeid (King Abdul Aziz University).

5. 16 September – 6 December: Europe

- Visiting Researcher, Rovira i Virgili University, Tarragona, Spain, 16 September – 6 December. Discussions with Professor G. Rozenberg. Co-operation with Professor C. Martin-Vide, Dr. G. Păun, Dr. Rodica Ceterchi. Seminar: *Passages of Proof*.
- Visit to LITA, EA 3097, Université de Metz, France, 28 September – 1 October. Seminar: *Computing a Glimpse of Randomness*. Co-operation with Professor Maurice Margenstern.
- Visit to the Institute for Theoretical Physics, the Technical University of Vienna, Austria, 2–5 October. Co-operation with Dr. S. Terwijn

and Professor K. Svozil.

- Visit to Niš University, Niš, Serbia, 6–8 October. Discussions with Professor G. Milovanović, Dean of Electronic Engineering, Dr. M. Metjić, Professor S. Markovski (“Ss. Cyril and Methodius” University Skopje, Republic of Macedonia), Dr. M. Mitrović, Professor M. Trajanović, Head of Information Systems. Seminar: *Passages of Proof*.
- Visit to the Faculty of Science, University of Novi Sad, Serbia, 9–11 October. Discussions with Professor S. Crvenković and A/Professor I. Dolinka. Seminar: *Computing a Glimpse of Randomness*.
- Visit to the Mathematical Institute, Belgrade, Serbia, 12–14 October. Discussions with Dr. Z. Ognjanović. Mathematics Colloquium: *What Is Turing Halting Problem?*
- Visit to Facultad de Informática, Universidad Politécnica de Madrid, Spain, 15–16 October. Discussions with Professor E. T. Giménez, Dean, and Professor J. Castellanos. Seminar: *Dialogues on Quantum Computing*.
- Participation to DLT’04 executive meeting (with Professor G. Rozenberg, Dr. G. Păun).
- Participation to CA’04 executive meeting (with Professor G. Rozenberg, Dr. G. Păun).
- Visiting Professor, Visiting Professor, Second International Ph.D. School in Formal Languages and Applications, Rovira i Virgili University, Tarragona, Spain. Course: *Quantum Computing*.
- Seminar: C. S. Calude, G. Păun. *Bio-Steps Beyond Turing Barrier*, Rovira i Virgili University, Tarragona, Spain, November 2003.
- Visit to the Institut für Informatik, Martin-Luther-Universität Halle-Wittenberg, Halle, Germany, 15–22 November. Co-operation with Professor L. Staiger. Informatics Colloquium: *Passages of Proof*.
- Visit to the Institut für Informatik, Postdam Universität, Postdam, Germany, 23 November. Discussions with Professor H. Jürgensen.
- Visit to the University of Bucharest, Romania, 24–28 November. Co-operation with Acad. S. Marcus and Professor D. Ștefănescu.
- Visit to “Ovidius” University, Constanța, Romania, 29–30 November. Discussions with Dr. C. Bogdan, Professors S. Sburlan and M. Ștefănescu and Dr. R. Vernic.

Conferences

1. C. S. Calude, L. Staiger. *Generalisations of Disjunctive Sequences*, “International Conference on Computability and Complexity in Analysis” (CCA 2003), University of Cincinnati, USA, August 2003.
2. J. J. Arulanandham, C. S. Calude, M. J. Dinneen. A fast natural algorithm for searching, *The 1st South-East European Workshop in*

Publications

I. Papers in Refereed Journals

1. J. J. Arulanandham, C. S. Calude, M. J. Dinneen. A fast natural algorithm for searching, *Theoret. Comput. Sci., Natural Computing*, accepted.
2. C. S. Calude, Elena Calude, M. J. Dinneen. What is the value of *Taxicab(6)*?, *J. UCS*, 9, 10 (2003), 1196–1203.
3. C. S. Calude, S. Marcus, L. Staiger. A topological characterization of random sequences, *Inform. Process. Lett.* 88 (2003), 245–250.
4. J. J. Arulanandham, C. S. Calude, M. J. Dinneen. Solving SAT with bilateral computing, *Romanian Journal of Information Science and Technology* 6, 1-2 (2003), 9–18.

II. Papers in Refereed Proceedings or Collections

1. V. A. Adamyan, C. S. Calude, B. S. Pavlov. Transcending the limits of Turing computability, in T. Hida (ed.). *Proceedings of Winter School, Meijo University, Japan*, World Scientific, Singapore, to appear.
2. C. S. Calude. Dialogues on quantum computing, in C. Martin-Vide, V. Mitrană and G. Păun (eds.). *Formal Languages and Applications*, Physica-Verlag, Heidelberg, 2004, to appear.
3. C.S. Calude. Who is afraid of randomness?, in E. von Collani (ed.). *‘Defining the Science of Stochastics’*, Heldermann Verlag, Sigma Series in Stochastics 1 2003, 95–116.
4. J. J. Arulanandham, C. S. Calude, M. J. Dinneen. Balance machines: Computing = balancing, in N. Jonoska, G. Păun, G. Rozenberg (eds.). *Aspects of Molecular Computing*, Lectures Notes in Comput. Sci. 2933, Springer Verlag, Berlin, 2003, 36–47.
5. C. S. Calude, L. Staiger. Generalisations of disjunctive sequences, in V. Bratka, M. Schröder, K. Weihrauch, N. Zhong (eds.). *Computability and Complexity in Analysis*, Informatik Berichte 302-8 FernUniversität in Hagen, 2003, 153–162.

III. Proceedings Editor

1. C. Calude, H. Maurer, A. Salomaa, K. Tochtermann (eds.). *J. UCS: the Journal of Universal Computer Science*, Vol. 8–2002, Springer Verlag, Berlin, 2003, 1066 pp.
2. C. Calude, M. Dinneen, V. Vajnovski (eds.). *Proc. 4th International Conf. DMTCS’03*, Lecture Notes Comput. Sci. 2731, Springer Verlag, Heidelberg, 2003, 307 pp.

IV. Research Reports¹

1. C. S. Calude, G. Păun. *Bio-Steps Beyond Turing*, *CDMTCS Research Report* 226, 2003, 28 pp.
2. C. S. Calude. Dialogues on Quantum Computing, *CDMTCS Research Report* 219, 2003, 13 pp.
3. C. S. Calude, M. J. Dinneen, V. Vajnoski (eds.). *Supplemental Papers for DMTCS'03*, *CDMTCS Research Report*, 215, 2003, 41 pp.
4. V. A. Adamyan, C. S. Calude, B. S. Pavlov. Transcending the Limits of Turing Computability, Los Alamos preprint archive, <http://quant-ph/0304128>, 16 April 2003.
5. C. S. Calude, L. Staiger, K. Svozil. Randomness Relative to Cantor Expansions, *CDMTCS Research Report* 213, 2003, 14 pp.

V. Miscellanea Papers

1. C. S. Calude. The theorem as an emotion, *Contemporarul* (2003) 5, 614 (2003), p. 32. (in Romanian)
2. C. Calude. News from New Zealand – 29, *EATCS Bull.* 79 (2003), 38–39.
3. C. Calude. News from New Zealand – 30, *EATCS Bull.* 80 (2003), 54–55.
4. C. Calude. News from New Zealand – 31, *EATCS Bull.* 81 (2003), 65–66.

Programme Committee

1. *10th Journées Montoises d'Informatique Théorique*, Université de Liège, Belgium, September 2004.
2. *1st South-East European Workshop in Formal Methods*, Thessaloniki, Greece, November 2003.
3. *Descriptive Complexity of Formal Systems (DCFS'03)*, Budapest, Hungary, July 2003.

Interviews

1. One-hour live interview *From Quantum Mechanics to Quantum Computing*, “Romania Tomorrow Channel”, Bucharest, Romania (interviewers: A. Mironov² and C. Român).
2. Interview *The Centre for Discrete Mathematics and Theoretical Computer Science?*, “Romanian Television”, filmed in Auckland (interviewer: A. Mironov).

¹Only papers which have not yet appeared elsewhere are listed.

²Most important Romanian science reporter.

Awards

1. *Honorificum Membrum*, Black Sea University, Bucharest, Romania, 2003.

Miscellanea

I was privileged to travel to 13 countries (in order³, Australia, Thailand, France, Romania, Germany, USA, Chile, Hong Kong, United Arab Emirates, Kingdom of Saudi Arabia, Spain, Austria, Serbia) and to meet/discuss/co-operate with very interesting people.

Acknowledgment

The *support* of the Research Committee of the University of Auckland, the Department of Computer Science and the Centre for Discrete Mathematics and Theoretical Computer Science, Université de Bourgogne, Dijon, France, the Centre for Mathematical Modelling, Universidad de Chile and CONICYT, Chile, Hong Kong University of Science & Technology, Hong Kong, Rovira i Virgili University, Tarragona, Spain is acknowledged with gratitude.

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³Some several times.