



**ERCIM "ALAIN BENSOUSSAN"
FELLOWSHIP PROGRAMME**



Scientific Report

First name / Family name	SOMA / DUTTA
Nationality	INDIAN
Name of the <i>Host Organisation</i>	Faculty of Mathematics, Informatics and Mechanics, University of Warsaw, Poland
First Name / family name of the <i>Scientific Coordinator</i>	ANDRZEJ SKOWRON
Period of the fellowship	01/10/2014 to 30/09/2015

I – SCIENTIFIC ACTIVITY DURING YOUR FELLOWSHIP

Areas of research on which some progress has been made:

- (i) Semantics of generalized quantifiers, considering from a fragment of natural language, from the perspective of rough sets (with Prof. Andrzej Skowron,

University of Warsaw, Poland)

- (ii) A logical approach towards synthesis of a compound concept from its components using a framework of positive and negative instances of a set of basic concepts (with Dr. Piotr Wasilewski, Prof. Andrzej Skowron, University of Warsaw, Poland)
- (iii) A dialogue based framework between users and decision maker in the context of graded consequence and fuzzy approximation space (with Prof. Andrzej Skowron, Dr. Piotr Wasilewski, University of Warsaw, Poland)
- (iv) Similarity based reasoning in the framework of logic of prototypes and counterexamples (with Prof. Lluís Godo, Prof. Francesc Esteva, IIIA, Autonomous University of Barcelona, Spain)
- (v) Theory of graded consequence in the framework of information flow in a distributed system (with Prof. Andrzej Skowron, University of Warsaw, Poland and Prof. Mihir K. Chakraborty, Jadavpur University, Kolkata, India)
- (vi) Generating group belief structure from a set of individual belief structures through dialogue (with Prof. Andrzej Szalas, and Prof. Barbara Dunin-Keplicz, University of Warsaw, Poland)

The work under (i) is accepted in *Fundamenta Informaticae*, and the work under (ii) is published in the conference proceedings of PReMI 2015 held at Warsaw from June 30 – July 3, 2015. An extended abstract on the work under (iii) is accepted for presentation at CS&P, 2015, going to be held at the University of Rzeszów, Poland from September 28-30, 2015. The work under (iv) and (v) are on progress, and some initial drafts have been exchanged with the respective collaborators. Some ideas have been exchanged about the work under (vi) with the respective researchers. A paper co-authored with Andrzej Skowron and Andrzej Jankowski on interactive granular computing is submitted to the new Springer journal of *Granular Computing*.

During the fellowship 2 papers have been published, and 5 are accepted. A book proposal on the Theory of Graded Consequence also has been accepted by Springer. Some of the work have been presented in 4 International conferences and workshop. Research Exchange Programme has been done at IIIA, Barcelona with the association of Prof. Lluís Godo and Prof. Francesc Esteva. A tutorial on the importance of distinguishing levels in a logical discourse has been presented at the University of Granada, Spain. A lecture on graded consequence in the context of interval-valued semantics is presented at the weekly

seminar of MIMUW, and have been a regular attendee of this weekly seminar.

Apart from these, an environment of collaborative research on adaptive logics has open up with Prof. Diderik Batens, Ghent University, Belgium.

Apart from my own research, I was also associated with several review processes of different journals, like Transactions of Rough Sets, Information Sciences, International Journal of Approximate Reasoning, and Fundamenta Informaticae.

I also obtained the Nostrification of my Ph.D in Poland. The Nostrification of Ph.D was awarded in Mathematics in the scope of Informatics by the Faculty of Mathematics, Informatics, and Mechanics, University of Warsaw, Poland in February 2015.

II – PUBLICATION(S) DURING YOUR FELLOWSHIP

Paper publication:

(i) Dutta S., Bedregal B.R.C., Chakraborty, M.K., Some instances of graded consequence in the context of interval-valued semantics, In Logic and Applications, M. Banerjee, Krishna S. (eds), LNCS 8923, 2015, 74-87.

(ii) Dutta S., Wasilewski P., Concept Synthesis using Logic of Prototypes and Counterexamples: a Graded Consequence Approach, M. Kryszkiewicz, S. Bandyopadhyay, H. Rybinski, S.K. Pal (eds), Pattern Recognition and Machine Intelligence, 6th International Conference, PReMI 2015, LNCS 9124, 303-313, 2015.

(iii) Dutta S., Skowron A., Generalized quantifiers in the context of rough set semantics, Special Issue of Fundamenta Informaticae (accepted).

(iv) The role of metalanguage in graded logical approaches, jointly authored with M.K.Chakraborty has been communicated to the LINZ 2014 Special Issue of Fuzzy Sets and Systems (accepted)

(v) Dutta S., Chakraborty M. K., Consequence-inconsistency interrelation: in the framework of paraconsistent logics, In New Ways to Paraconsistency, Jean-Yves Beziau, M.K. Chakraborty, S. Dutta (eds.), Springer (to be published).

(vi) Dutta S., Chakraborty, M. K., Towards a proof theory of graded consequence: semantics behind syntax, In Aftermath of the Logical Paradise, J.-Y.Beziau, I.M.L.D'Ottaviano and A.Costa-Leite (eds), CLE-UNICAMP, Campinas. in the book series of the Center for Logic and Epistemology at the State University of Campinas, Brazil (to be published).

(vii) Skowron A., Jankowski A., Dutta S., Toward problem solving support based on big data and domain knowledge: Interactive granular computing and adaptive judgment, In Big Data Analysis, Series: Studies in Big Data, N. Japkowicz and J. Stefanowski (eds), Springer Heidelberg, 2015 (in print).

Book publication:

- (i) A book proposal jointly with Mihir K. Chakraborty on the Theory of graded consequence has been accepted by Springer.
- (ii) Jointly (with Jean-Yves Beziau, Mihir K. Chkaraborty) editing a volume for the Proceedings of the fifth World Congress on Paraconsistency (WCP5) from Springer.

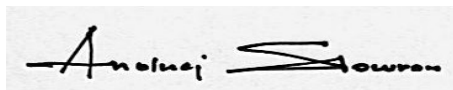
III – ATTENDED SEMINARS, WORKHOPS, CONFERENCES

- (i) Presented paper in Asian Logic Conference, 2015, held at IIT, Bomabay, India from January 5-9, 2015.
- (ii) Presented paper in Indian Conference on Logic and Applications 2015, held at IIT, Bomabay, India from January 8-10, 2015.
- (iii) Presented paper at Rough Set Theory Workshop 2015, held at University of Warsaw, Poland on 29th June 2015.
- (iv) Presented paper at the international conference on Pattern Recognition and Machine Intelligence 2015, held at the Technical University of Warsaw, from June 30 – July 3, 2015.
- (v) Presented tutorial at the University of Granada during May 18-19, 2015.
- (vi) Will present a tutorial on paraconsistency in the international workshop on Logic and Computability, to be held at Indian Statistical Institute, Kolkata from September 16 to 17, 2015.
- (vii) Will present a paper in CS&P 2015, to be held at the University of Rzeszow, from September 28 to 30, 2015.

IV – RESEARCH EXCHANGE PROGRAMME (REP)

During May 10-17 2015, a research on similarity based reasoning in the framework of logic of prototypes and counterexamples is initiated with the association of Prof. Lluís Godo and Prof. Francesc Esteva at The Artificial Intelligence Research Institute (IIIA), Barcelona as a part of the fulfillment of the Research Exchange Programme of ERCIM fellowship. The work is under progress and we have exchanged a few initial drafts on the work, which has been developed yet. Later, this collaborative work also has been joined by Dr. Thomas Vetterlein, Johannes Kepler University, Linz, Austria.

I am approving the scientific report by Dr. Soma Dutta

A handwritten signature in black ink on a light grey background. The signature reads "Andrzej Skowron" in a cursive, slightly stylized font. The first name "Andrzej" is written in a more traditional cursive, while "Skowron" has a more fluid, connected style.

Prof. Andrzej Skowron