

**Shota Rustaveli National Science Foundaiton (SRNSF)  
Call for Applied Research Grants**

1. General Information about the project<sup>1</sup>

1	Project ID number	
2	Project title	Creating the Georgian Speech recognizer sistem
3	Principal Investigator	Nana Gulua
4	Principal Investigator's phone number, E-mail address	+995 599 510711 <a href="mailto:ngulua7@mail.ru">ngulua7@mail.ru</a>
5	Project coordinator	Irakli Kardava
6	Project coordinator's phone number, E-mail address	+995 591 117778 <a href="mailto:sokhummi@yahoo.com">sokhummi@yahoo.com</a>
7	Host Institution	Sokhumi State University
8	Host Institution's webpage	<a href="http://sou.edu.ge/">http://sou.edu.ge/</a>
9	Project Total Budget (GEL)	
10	Requested total amount from SRNSF (GEL)	
11	Co-funding in GEL (if applicable )	
12	Project duration (months)	
13	Co-participant institution #1 (if applicable)	
14	Co-participant institution's webpage	
15	Co-participant institution #2 (if applicable)	
16	Co-participant institution's webpage	
17	Co-funding organization and/or Co-funding individual <sup>2</sup> (In case such exists)	
18	Foreign consultant's name, surname (If applicable)	Bakyt Orozbaev
19	Foreign consultant's workplace, position, telephone number, e-mail address	Adam Miczkiewicz University, Center of Nanobio medicine, Scientific worker
20	Project scientific fields and sub-fields <sup>3</sup>	
	Field 1	1- Natural sciences
	Sub-fields (Coding, Title)	1.2 Computer and Information Sciences
	Field 2	2 - Engineering and Technologies

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2. Key personnel of the project (mandatory field)

№	Key personnel <sup>4</sup> (surname, name)	ID number	Position	Academic Degree (PhD, MA / PhD student/ MA Student)	Date of birth (day/month/year)
1	Nana Gulua		Investigator	PhD	
2	Irakli Kardava		Coordinator	PhD student	
3	Jemal Antidze		Key personal	PhD	
4	Natia Putkaradze		Key Personal	PhD student	
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n					

**Shota Rustaveli National Science Foundaiton (SRNSF)  
Call for Applied Research Grants**

**Project Proposal form**

(Up to 10 pages in English, including functions, tables, diagrammes and illustrations if any

For English language text: font: Times New Roman, size: 11. Paragraph spacing 1. Right and left margins: 1cm. Top and Bottom 1cm.)

**1. Scientific component and practical application of the project**

**1.1. Significance of the research topic, novelty of research, formulation of the problem**

Please provide Brief introduction of the research topic; Project justification: showing significance of the research project. Description of scientific and technological novelty of the objectives set as part of the research project. Formulation of the problem, etc. (*recommended up to 600 words*).

Speech recognition (SR) is the inter-disciplinary sub-field of computational linguistics which incorporates knowledge and research in the linguistics, computer science, and electrical engineering fields to develop methodologies and technologies that enables the recognition and translation of spoken language into text by computers and computerized devices such as those categorized as smart technologies and robotics. It is also known as "automatic speech recognition" (ASR), "computer speech recognition", or just "speech to text" (STT). Nowadays, the already existing speech recognition systems can automatically transform into texts the spoken words or sentences in a certain amount of languages. Using this opportunity, the communication is established between the human and the artificial intelligence, in general, between human and device, speaking in natural languages, which give us a lot of type of positive results as scientific, as well as a commercial point of view. Besides this, that Georgian language is among one of the world's unique and ancient languages, still, it doesn't have a perfect acoustic model and the relevant software, which transforms into text all of the Georgian speaking people's conversations and make compatible all the opportunities of processed languages for Georgian language. For example: 1. Google voice system; 2. Google translate; 3. Skype translator and act [1].

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## **1.2. Research goals and objectives**

Describe goals and objectives of the research project; List and briefly describe objectives and phases needed for achieving the overall goal of the project. Please also include deliverables (*recommended up to 600 words*).

The first goal is to record the conversations of Georgian speaking people in different ages, genders and people with different emphasis (It is needed to record up to 250 people. For the best result, it is preferably the duration of one record to be 10 minutes, 16 KHz, a mono signal). After recording, the given audio files should be analyzed and classified.

The next stage is the training of artificial neural networks based on audio recordings, after this it is enabled to obtain an acoustic model of the Georgian language. At the same time, it is needed to create the base of words and language model with appropriate phonemic explanations.

The main goal of research is to create a software, which will be able to transform into text all of the Georgian speaking people's conversations by the above-mentioned components unification. Besides the creating of the Georgian speech recognition system, it is planned to give the software an additional function, which will perform Georgian voice commands and will be able to integrate Georgian language with Google, Bing, Wikipedia as a local program. It should be noted, that the program will work according to all of the Georgian speaking people's conversations.

## **1.3. Research methodology**

Describe the innovative approaches that will be used in the planned research. Provide justification of the research methodology and its relevance to the project aims. Describe expected challenges and their solutions (*recommended up to 400 words*).

The main part of the work will be loaded with innovative methods of approach, insofar the Georgian speaking and in general, some features of the Georgian language are radically different from any other language features. Therefore, there will be developed a totally new method, which implementation will take into account the Georgian language criteria. In addition, it is known that the language may have tens of emphasizes. It means, that besides the given word's identical phonemic compositions, pronunciation, its different emphasis and speed [2], we get the different sound waves (the emphasis can be as a natural, as well as unnatural [3]). In case when sound dialogue is demanded between the device and the device). The difference in pronunciation accents and innovation of speech, in general, makes one of the most common and still insurmountable problems of speech recognition, which often leads a low level and quality of software working. It is planned to develop the module of removing accent problems and its implementation during the project [4].

During the project, the database of words didn't enrich only by already existed traditional method, but, we plan to use out method, which provides to receive all the grammatically correct word-forms by giving of unchanged part of the word [5].

## **1.4. Scientific importance of the research outcomes and/or their practical application and dissemination of project's outcomes**

Describe the scientific importance of the project's expected outcomes for specific region, country, society and field. Depict the project's importance for the country's technological development, prospect of developing a new or improved equipment, technology, product, construction and improved prototype following the completion of the project. Prospects of collaboration between research and business sector in the framework of the project or after its completion (*recommended up to 400 words*).

The Georgian language acoustic model, the word's database, a language model and the existence of the software based on these, will provide various types of experiences in the field of artificial intelligence, which is required to

do a sound dialogue between human and device, or between device and device after the project implementation. Also, using the achieved improved results will be effective for various fields:

1. It will be possible to receive automatically the court trial act book / protocols in the text forms, without using the keyboard buttons. (Speech recognizer is approved in several countries);
2. People with disabilities (blindness, people without upper limbs) will be able to easily manage the computer's capabilities, using by Georgian voice commands;
3. It is recommended to use this opportunity to control the combat vehicles. (Land, sea and air combat vehicles);
4. The perfect acoustic model of Georgian language will be more effective for journalists, who have type in the keyboard the given text written in the paper or from the audio files;
5. It will be very important to create a Georgian learning system for Georgian Diaspora, based on above-mentioned program;
6. It will be created the different type of software, which will be managed by the Georgian Voice commands;
7. The result of the project can be used in Microsoft Windows, Linux, iOS and act, also in the any website and for integrating with Google;
8. The achieved result will promote the creation of different type of equipment in various fields, which will be managed by Georgian voice commands;
9. Georgian speech converting into text and other created software, based on this opportunity will be attractive and interesting for foreigners as a technologically, as well as scientifically;
10. For foreigners, who would like to learn Georgian language, will be able to pronounce the word in Georgian and receive its translation in their own language, without typing letters on the keyboard;
11. For older people, to whom it is difficult to understand the functions of the computer buttons, will be easier to use the computer using the Georgian voice commands.

### **1.5. Commercialization potential of the research outcomes**

Describe the relevance of the research outcomes in terms of international and local market demands. Briefly provide the review of the potential market and consumer, competitiveness, uniqueness and excellence of the project's outcomes. Please also indicate expected social and economic effect of the research project for the specific region/country/society/ field, etc. (*recommended up to 400 words*).

The perfect acoustic model can be imagined as a commercial product. In case of the final outcome of the project implementation, we will have the opportunity to offer the integration of the Georgian acoustic model (like already realized languages) to the already approved and successfully implemented commercial software makers, also the representatives of widely used social networks. Besides this, from the local authorities are very big demand for the Georgian speech recognition system to be introduced and implemented as their service centers, as well as the official web pages.

## **2. International and local collaboration**

Describe the possibilities of existing or planned local or/and international intra and inter-institutional collaboration and activities (*recommended up to 400 words*).

There are a lot of suggestions from the international organizations and private companies, who would like to create the innovative programs and mobile application in Georgia, where will be integrated the Georgian speech recognizer software. Therefore, we can say, that achieved results after project implementation will be practically used a domestic and international system of software, like already existed and realized languages. Also, there are suggestions to create individual independent devices, which will be supported by Georgian voice commands.

### 3. Project management and feasibility

#### 3.1. Adequacy of project implementation timeframe (action plan, stages and ways of implementation) with research aims and objectives

Description/justification and implementation by the key personnel of the project's aims and objectives according to the work-plan/schedule (*recommended up to 300 words*).

(Objectives should be in accordance to project's implementation timeframe, attachment № 6)

The schedule of the presented project implementation is created on the base of the international scientific research experience. In addition, we have been consulted by scientists who work in the same direction in different languages and had implemented the speech recognition systems into a well-known international system. Also, all the nuances and hindrance details are considered that may be followed such kind of work. Therefore, it must be said, that the project implementation schedule is in full compliance with the goals and solutions for the research.

#### 3.2. Budget relevance to the research aims and objectives

Briefly describe and justify project's management scheme and usage of human and technical resources; describe the link between objectives and the offered product, service etc. by the budget spending categories (*recommended up to 300 words*).

In view of the fact that the project scope is different to each other, they are grouped into content and stepping categories. Based on the specific work of this project, we need the different number of staff during the each tranche period. Thus, the each stage expenditures is customized for the human resource and the task difficulties to each specific period.

#### Reference

- [1] Irakli Kardava - *Georgian Speechrecognizer in Famous Searching Systems and Management of Software Package by Voice Commands in Georgian Language*, Third International Conference on Advances in Computing, Electronics and Communication - Conference Proceedings, pages 4, October 2015, Zürich, Switzerland;
- [2] T. Yoshimura, K. Tokuda, T. Masuko, T. Kobayashi and T. Kitamura, *Simultaneous Modeling of Spectrum, Pitch and Duration in HMMBased Speech Synthesis*, Proc. Of EUROSPEECH, vol.5, pp.2347–2350, 1999.
- [3] Z. Wang, T. Schultz, and A. Waibel, "Comparison of acoustic model adaptation techniques on non-native speech", in *ICASSP 2003*. IEEE, 2003, pp. 540–543.
- [4] Irakli Kardava, Jemal Antidze and Nana Gulua - *Solving the Problem of the Accents for Speech Recognition Systems*, International Journal of Signal Processing Systems, pages 235-238. June 2015, USA;
- [5] J.Antidze, N.Gulua, I.Kardava - *The Software for Composition of Some Natural Languages' Words*, Lecture Notes on Software Engineering, vol.1, #3, pages 295-297. <http://www>

**Shota Rustaveli National Science Foundaiton (SRNSF)  
Applied Research Grant**

**Project Summary**

(Recommended up to 250 words)

**Project Title: Creating the Georgian Speech Recognizer System**

**Host Institution: Sokhumi State University**

**Principal Investigator: Nana Gulua**

**Project Coordinator: Irakli Kardava**

Speech recognition (SR) is the inter-disciplinary sub-field of computational linguistics which incorporates knowledge and research in the linguistics, computer science, and electrical engineering fields to develop methodologies and technologies that enables the recognition and translation of spoken language into text by computers and computerized devices such as those categorized as smart technologies and robotics. It is also known as "automatic speech recognition" (ASR), "computer speech recognition", or just "speech to text" (STT). Nowadays, the already existing speech recognition systems can automatically transform into texts the spoken words or sentences in a certain amount of languages. Using this opportunity, the communication is established between the human and the artificial intelligence, in general, between human and device, speaking in natural languages, which give us a lot of type of positive results as scientific, as well as a commercial point of view. Besides this, that Georgian language is among one of the world's unique and ancient languages, still, it doesn't have a perfect acoustic model and the relevant software, which transforms into text all of the Georgian speaking people's conversations and make compatible all the opportunities of processed languages for Georgian language. For example: 1. Google voice system; 2. Google translate; 3. Skype translator and act.

## CURRICULUM VITAE

01006009811

.....  
 ID number  
 13.12.1968  
 .....

Date of Birth (D/M/Y)

**Principal Investigator**

.....  
 Position/responsibility in the project (Principal Investigator, Project Coordinator, Key Personnel, etc.)  
 .....

## Research Interests

Software Engineering, Computer linguistics

**1. Education**

№	Years	Name of the University/Institute, Country	Academic Degree	Major / Specialty
1	1985-1990	Sukhumi Branch of the Tbilisi State University, Georgia	Mathematics	Teacher of Mathematics
2	1995-1999	Sukhumi Branch of the Tbilisi State University, Georgia	Doctoral Student	Computer Science
3	1999	N.Muskhelishvili Institute of Computing mathematics Georgian Academy of Sciences	PhD	Computer Science
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**2. Work Experience**

№	Years	Position	Department / Unit	Organization
1	1991-1999	Teacher	Applied Mathematics	Sukhumi Branch of the Tbilisi State University
2	1991-2001	Research Associate	I.Vekua Scientific Institute of Applied Mathematics	Tbilisi State University
3	1999-2006	Associated Professor	Applied Mathematics	Sukhumi Branch of the Tbilisi State University
4	2006-2009	Associated Professor	Computer Science	Sukhumi Branch of the Tbilisi State University
5	since 2009	Professor	Computer Science	Sukhumi State University

**3. Participation in Research Projects (over the last 5 years)**

№	Years	Position / Responsibility	Project Title	Donor Organization
1	2015	<b>Principal Investigator</b>	<b>"Automation of the informational availability of Sokhumi State University "</b>	Sukhumi State University

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#### 4. List of Publications in the International Peer Reviewed Journals(over the last 5 years)<sup>5</sup>

№	Publication Title	Journal title, series, volume issue (publication date): page(s) or, book / monograph title, edition #, series publisher, city, year published
1	Solving the Problem of the Accents for Speech Recognition Systems	International Journal of Signal Processing Systems, USA, June 2015, pages 235-238.
2	The software for composition of some natural language words	Lecture Notes on Software Engineering, vol.1, #3, August 2013, Singapore, pages 295-297
3	Software Tools for Some Natural Language Texts Computer Processing	International Journal of Computer Technology and Application, David Publishing Company, vol. 3, #3, 2012, USA
4	The Software for Composing of Georgian Words	Transactions of The International Scientific Conference Dedicated to the 90 Anniversary of Georgian Technical University, Tbilisi, Georgia, 19-21 September, 2012, Pages 367-371 ,
5	Generalized Tools for Computer Realization of Natural Language Models	Proceedings of “The Eleventh International Conference on Pattern Recognition and Information Processing”, Minsk, Belarus, 2011, pages 362-365
6	Towards the Use of Rule-Based Programming for Computer Morphological, Syntactic and Semantic Analyses of the Georgian Texts	International Conference - The Georgian Language and Modern Technologies - 2011, Tbilisi, Georgia, 2011, pp. 27-29.
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<sup>5</sup>It is mandatory to provide a resume of the paper in English in case it isn't published in international peer reviewed journals and the language of publication was other than English (i.e. Georgian, Russian, etc). This refers to principal investigators publications only.



**5. Participation in International Forums/Conferences (up to 5 events)**

№	Year	Event title	Venue	Presentation title
1	2015	2015 5th International Conference on Computer Communication and Management	Rome, Italy	Solving the Problem of the Accents for Speech Recognition Systems
2	2013	2nd International Conference on Software and Computer Applications	Paris, France	software tools for computer modeling of a natural language texts, keynote speech
3	2011	The Eleventh International Conference on Pattern Recognition and Information Processing	Minsk, Belarus	Generalized Tools for Computer Realization of Natural Language Models
4	2011	International Conference - The Georgian Language and Modern Technologies	Tbilisi, Georgia	Towards the Use of Rule-Based Programming for Computer Morphological, Syntactic and Semantic Analyses of the Georgian Texts
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**6. List of Patents(up to 5 patents)**

№	Date	Title of Invention	Patent-granting Organization, Country
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**7. Additional Information (International Awards, Fellowships, etc.)**

I received a presidential grant in 2000-2003.

I am a Member of Academy of Science Abkhazia since 2009

## CURRICULUM VITAE

	Irakli Kardava	62005023784
Telephone	Name, Surname +995 591117778	ID number 01/11/1986
E-mail	<a href="mailto:sokhummi@yahoo.com">sokhummi@yahoo.com</a>	
Webpage	<a href="http://www.irakli-geo.hol.es">www.irakli-geo.hol.es</a>	Date of Birth (D/M/Y)

## Project Coordinator

Position/responsibility in the project (Principal Investigator, Project Coordinator, Key Personnel, etc.)

Software Engineering, Computer Science (Computer Linguistics), Artificial Intelligence, Nano Technology

## Research Interests

## 1. Education

Nº	Years	Name of the University/Institute, Country	Academic Degree	Major / Specialty
1	2009	Sokhumi State University – Tbilisi, Georgia	Bachelor	Bachelor of Computer Science
2	2012	Sokhumi State University – Tbilisi, Georgia	Master	Master of Computer Science
3	Since - 2013	Sokhumi State University – Tbilisi, Georgia	PhD Student	PhD Student of Computer Science
4	Since - 2015-	Adam Mickiewicz University – Poznan, Poland	PhD Student	PhD Student of Physics
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## 2. Work Experience

Nº	Years	Position	Department / Unit	Organization
1	2010-2011	Researcher, Programmer	Ilia Vekua Institute of Applied Mathematics (VIAM) and I. Javakhishvili Tbilisi State University (TSU), Tbilisi, Georgia	Tbilisi State University
2	2012-2015	Lecturer	Computer Science	Sokhumi State University
3	2014-2015	Scientist, Researcher	Scientist researcher at Research Institute of the Software and Artificial Intelligence of Sukhumi State	Sokhumi State University

			University	
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### 3. Participation in Research Projects (over the last 5 years)

№	Years	Position / Responsibility	Project Title	Donor Organization
1	2013-2014	Programmer	Rule based programming with second order and sequential variables	Rustaveli National Scientific Foundation
2	2014	Programmer	Step-by-step to Knowledge	Government of Turkey
3	2015-2017	Programmer	CLP (HC): Fundamentals, Implementation, Applications	Rustaveli National Scientific Foundation
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### 4. List of Publications in the International Peer Reviewed Journals (over the last 5 years) <sup>6</sup>

№	Publication Title	Journal title, series, volume issue (publication date): page (s) or, book / monograph title, edition #, series publisher, city, year published
1	The Software for Composing Georgian Words	Transactions of II International Conference Dedicated to the 90th Anniversary of Georgian Technical University, 367-371 pages. Georgia, 2012;
2	The Software for Composition of Some Natural Languages' Words	Lecture Notes on Software Engineering, vol.1, #3, pages 295-297. <a href="http://www.lnse.org/show-29-75-1.html">http://www.lnse.org/show-29-75-1.html</a> August 2013, Singapur
3	Solving the Problem of the Accents for Speech Recognition Systems	International Journal of Signal Processing Systems, pages 235-238. June 2015, USA
4	Some Steps to Dialogue Between Human Brain and Artificial Intelligence	Monograph, 64 pages. October 2015, ISBN-13: 978-3-659-76480-6, Lambert Academic Publishing, Copyright © OmniScriptum GmbH & Co. KG, Saarbrücken, Germany
5	Georgian Speechrecognizer in Famous Searching Systems and Management of Software Package by Voice Commands in Georgian Language (Edvanced Version)	International Journal of Advances in Computer Science & Its Applications, pages 48 – 51, Volume 6 issue 1, New York, NY 10004, USA, 2016
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<sup>6</sup> It is mandatory to provide a resume of the paper in English in case it isn't published in international peer reviewed journals and the language of publication was other than English (i.e. Georgian, Russian, etc). This refers to principal investigators publications only.

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**5. Participation in International Forums/Conferences (up to 5 events)**

№	Year	Event title	Venue	Presentation title
1	2012	IV International Conference of the Georgian Mathematical Union	Batumi, Georgia	Morphological Synthesis of Georgian Words Using Formal Grammar, Sh. Rustaveli State University
2	2013	2013 2nd International Conference on Software and Computer Applications,	Paris, France	The Software for Composition of Some Natural Languages' Words
3	2014	The sixth international symposium on Kartvelian studies	Tbilisi, Georgia	Morphological Synthesis of Georgian Words, I. Javakhishvili Tbilisi State University (TSU)
4	2015	2015 5th International Conference on Computer Communication and Management (ICCCM 2015)	Rome, Italy	Solving the Problem of the Accents for Speech Recognition Systems
5	2015	Humboldt Kolleg Tbilisi - Science in Georgia: Perspectives of development and the role of Humboldt Foundation	Tbilisi, Georgia	Georgian Speechrecognizer in Famous Searching Systems and Management of Software Package by Voice Commands in Georgian Language
6	2015	Third International Conference on Advances in Computing, Electronics and Communication - ACEC 2015	Zurich, Switzerland	Georgian Speechrecognizer in Famous Searching Systems and Management of Software Package by Voice Commands in Georgian Language (Advanced Version)

**6. List of Patents (up to 5 patents)**

№	Date	Title of Invention	Patent-granting Organization, Country
1			
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**7. Additional Information (International Awards, Fellowships, etc.)**

- Scholarship – Erasmus Mundus, EMINENCE II, Poznan, Poland.**
- Member of the International Association of Computer Science and Information Technology (IACSIT, 9 Jurong Town Hall Road iHUB, Singapore 609431).**

## CURRICULUM VITAE

Jemal Antidze		
	Name, Surname	ID number
Telephone	555231237	01008000888
E-mail	jeantidze@yahoo.com	
Webpage	http://fpv.science.tsu.ge	Date of Birth (D/M/Y)
		25/06/1935

### Key Personnel

Position/responsibility in the project (Principal Investigator, Project Coordinator, Key Personnel, etc.)

### Research Interests

Software Engineering, Computer linguistics

### 1. Education

№	Years	Name of the University/Institute, Country	Academic Degree	Major / Specialty
1	1953 - 1958	I.Javakhishvili Tbilisi State University, Georgia	Mathematics	Teacher of Mathematics
2	1958 - 1961	I.Javakhishvili Tbilisi State University, Georgia	Doctoral Student	Computer Science
3	1966	I.Javakhishvili Tbilisi State University, Georgia	PhD in Mathematics	Candidate of Mathematical Science
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### 2. Work Experience

№	Years	Position	Department / Unit	Organization
	1961 - 1966	Assistant Professor	Faculty of Mechanics and Mathematics	I.Javakhishvili Tbilisi State University
2	1967- 1973	Senior Researcher	I.Vekua Scientific Institute of Applied Mathematics	I.Javakhishvili Tbilisi State University
3	1973- 2006	A Head of Scientific Department of System's Programming	I.Vekua Scientific Institute of Applied Mathematics	I.Javakhishvili Tbilisi State University
4	2006- 2009	Associated Professor	Faculty of Cybernetics and Computer Science	I.Javakhishvili Tbilisi State University
5	since 2011	Associated Professor	Faculty of Mathematics and Computer Science	Sokhumi State University

### 3. Participation in Research Projects (over the last 5 years)

№	Years	Position / Responsibility	Project Title	Donor Organization
1	2013- 2015	Scientific Head	A Pattern Calculus with Hedge variables	SRNSF

2	2015-2017	Scientific Head	LCP(HC): foundation, implementation, applications	SRNSF
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#### 4. List of Publications in the International Peer Reviewed Journals (over the last 5 years) <sup>7</sup>

№	Publication Title	Journal title, series, volume issue (publication date): page (s) or, book / monograph title, edition #, series publisher, city, year published
1	One approach on programming of some large volume projects	Proceedings of 2015 Tbilisi international conference on computer science and applied mathematics, Nekeri, Tbilisi, March 2015, pages 49-52
2	Solving the Problem of the Accents for Speech Recognition Systems	International Journal of Signal Processing Systems, USA, June 2015, pages 235-238.
3	The software for composition of some natural language words	Lecture Notes on Software Engineering, vol.1, #3, August 2013, Singapore, pages 295-297
4	Software Tools for Some Natural Language Texts Computer Processing	International Journal of Computer Technology and Application, David Publishing Company, vol. 3, #3, 2012, USA
5	The Software for Composing of Georgian Words	Transactions of The International Scientific Conference Dedicated to the 90 Anniversary of Georgian Technical University, Tbilisi, Georgia, 19-21 September, 2012, Pages 367-371
6	Generalized Tools for Computer Realization of Natural Language Models	Proceedings of “The Eleventh International Conference on Pattern Recognition and Information Processing”, Minsk, Belarus, 2011, pages 362-365
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#### 5. Participation in International Forums/Conferences (up to 5 events)

№	Year	Event title	Venue	Presentation title
1	2015	2015 Tbilisi international conference on computer science and applied mathematics	Tbilisi, Georgia	One approach on programming of some large volume projects
2	2015	2015 5th International Conference on Computer Communication and Management	Rome, Italy	Solving the Problem of the Accents for Speech Recognition Systems

<sup>7</sup> It is mandatory to provide a resume of the paper in English in case it isn't published in international peer reviewed journals and the language of publication was other than English (i.e. Georgian, Russian, etc). This refers to principal investigators publications only.

3	2013	2 <sup>nd</sup> International Conference on Software and Computer Applications	Paris, France	software tools for computer modeling of a natural language texts, keynote speech
4	2011	Sixth International Symposium on Kartvelian Studies	Tbilisi, Georgia	Morphological Synthesis of Georgian Words
5	2013	Second International Conference “Modern Problems in Applied Mathematics”	Tbilisi, Georgia	Programming means for modeling of natural and formal languages

#### 6. List of Patents (up to 5 patents)

№	Date	Title of Invention	Patent-granting Organization, Country
1			
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**7. Additional Information (International Awards, Fellowships, etc.)** I have 100 published scientific works on theoretical and practical problems of programming; I have been participated in many international scientific conferences as a honorary chair or co-chair of conferences(see <http://fpv.science.tsu.ge>). For example: 1-2 June 2013, I was co-chair of 3 international conferences in Paris, with my keynote speech, organized by The International Association of Computer Science and Information Technologies (IACSIT); 1-2 May 2014, I was a honorary chair of 3 international conference in Singapore, organized by IACSIT; 17-18 September 2014, I was a co-chair of 3 international conference in Paris, organized by IACSIT;. In 2015, I was invited in many conferences as a honorary chair, co-chair or program committee member. By my supervision seven postgraduate students have done PhD dissertations in Software Engineering. Many of them are working abroad at scientific institutes. I am: an expert of UNESCO in informatics; A senior member of IACSIT; A redactor-in-chief of international journal - Lecture Notes on Software Engineering (LNSE); A redactor of the international journal on software engineering, American Science and Education Publishing; A member of scientific committee of International Academy of Engineers. An academic member of Athens institute for education and research.

## CURRICULUM VITAE

	Natia Putkaradze	01019017882
Telephone	Name, Surname 555-300-104	ID number 25.02.1984
E-mail	nNatia.putkaradze@tsu.ge	
Webpage		Date of Birth (D/M/Y)

**Key Personnel**

Position/responsibility in the project (Principal Investigator, Project Coordinator, Key Personnel, etc.)

**Kartvelian Linguistics, Verb, Computational Linguistics, Corpus Linguistics**

Research Interests

**1. Education**

№	Years	Name of the University/Institute, Country	Academic Degree	Major / Specialty
1	2009 - Till now	Ivane Javakhishvili Tbilisi State University	PhD Student	Kartvelian Linguistics
2	2007- 2009	Ivane Javakhishvili Tbilisi State University	MA	Kartvelian Linguistics
3	2001- 2005	Ivane Javakhishvili Tbilisi State University	BA	Georgian Philology
4	2001- 2005	Ivane Javakhishvili Tbilisi State University	Teacher	University Program for the preparation of teachers of the secondary schools
5				

**2. Work Experience**

№	Years	Position	Department / Unit	Organization
1	2013- 2016	scientist, Board member	Board	Giorgi Akhvlediani Society for the History of Linguistics
2	2016	Visiting lecturer	Faculty of Humanities	Caucasus University
3	2013	Visiting lecturer	Faculty of Humanities	Ivane Javakhishvili Tbilisi State University
4	2009- 2012	research-fellow	Department of the computational processing of the linguistics data	TSU Arnold Chikobava Institute of Linguistics



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### 3. Participation in Research Projects (over the last 5 years)

№	Years	Position / Responsibility	Project Title	Donor Organization
1	2013-2016	Key personnel	Eurasian theory and Georgia	Shota Rustaveli National foundation
2	2010	Key personnel	Oral History, theory and practice	Fund "Taso"
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### 4. List of Publications in the International Peer Reviewed Journals (over the last 5 years) <sup>8</sup>

№	Publication Title	Journal title, series, volume issue (publication date): page (s) or, book / monograph title, edition #, series publisher, city, year published
1	The verbs of the structure R-d-u-u(n) in Megrelian (Article)	Iberian Caucasia Linguistics, vol. 44
2	The Difficulties in the Process of Teaching the Category of Voice and the Kartvelian Verb (co-author) (Article)	Articles, materials of SOCIOINT15-2nd International Conference on Education, social Sciences and Humanities, pp.828-834 <a href="http://www.ocerint.org/socioint15_epublication/papers/435.pdf">http://www.ocerint.org/socioint15_epublication/papers/435.pdf</a>
3	An X-Bar Approach to Georgian and German (Article)	Tbilisi International Conference on Computer Science and Applied Mathematics, pp.: 32-40
4	Die autoactiven Verben der I, und II. Diathese im Mingrelischen (Article)	Georgika, 2012, pp.8-17
5	TEI Standard for Co-build Dictionaries (Abstracts)	International Symposium in Lexicography, pp. 164-165
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### 5. Participation in International Forums/Conferences (up to 5 events)

№	Year	Event title	Venue	Presentation title
1	2015	IV International Symposium of Linguist-Caucasiologists	Tbilisi, Georgia	Towards the structure of the stem of absolute Megrelian verbs of the structure R-th.s.-d-u-(u)n

<sup>8</sup> It is mandatory to provide a resume of the paper in English in case it isn't published in international peer reviewed journals and the language of publication was other than English (i.e. Georgian, Russian, etc). This refers to principal investigators publications only.

2	2015	Colloque international: Langue et Territoire 2	Tbilisi, Georgia	Ukrainian language and Eurasian theory in 1926-1952
3	2015	ILI – Ideology and Linguistic Ideas	Tbilisi, Georgia	The religion issues in N. Trubetzkoy’s works
4	2015	Socioint15 - 2nd International Conference on Education, social Sciences and Humanities,	Istanbul, Turkey	The Difficulties in the Process of Teaching the Category of Voice and the Kartvelian Verb (co-author)
5	2015	Tbilisi International Conference on Computer Science and Applied Mathematics	Tbilisi, Georgia	An X-Bar Approach to Georgian and German
6	2014	ICHOLS XIII	Villa-real, Portugal	Historical and modern classifications of Megrelian Verb
7	2012	International Symposium in Lexicography	Batumi, Georgia	TEI Standard for Co-build Dictionaries (Abstracts)

#### 6. List of Patents (up to 5 patents)

№	Date	Title of Invention	Patent-granting Organization, Country
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#### 7. Additional Information (International Awards, Fellowships, etc.)

2011- Participation in the international conference, Batumi, Georgia, Subject Domain: Corpus Linguistics, The term representative in Corpus Linguistics, Abstracts,  
[https://www.academia.edu/4237905/The\\_Term\\_Representative\\_in\\_Georgian\\_Corpus\\_Linguistics\\_Abstracts\\_2011](https://www.academia.edu/4237905/The_Term_Representative_in_Georgian_Corpus_Linguistics_Abstracts_2011)

2009 – Ilia Chavchavadze Scholarship (Presidential scholarships for the young researchers)

## CURRICULUM VITAE

Bakyt Orozbaev

Telephone	Name, Surname	ID number
E-mail		22.01.1977
Webpage		Date of Birth (D/M/Y)

## Project Coordinator

Position/responsibility in the project (Principal Investigator, Project Coordinator, Key Personnel, etc.)

## Physics

## Research Interests

## 1. Education

№	Years	Name of the University/Institute, Country	Academic Degree	Major / Specialty
1	2012	<b>Adam Mickiewicz University</b> , Department of Macromolecular Physics, Poland	PhD	Physics
2	1998-2000	<b>Kyrgyz State National University</b> , Department of Electronic and Microelectronic, Kyrgyzstan	Master's degree	Physics
3	1994-1998	<b>Kyrgyz State National University</b> , Department of Electronic and Microelectronic, Kyrgyzstan	Bachelor's degree	Physics
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## 2. Work Experience

№	Years	Position	Department / Unit	Organization
1	2013	Scientific position	Department of Macromolecular Physics	Adam Mickiewicz University
2	207-2013	Technical staff	Department of Macromolecular Physics	Adam Mickiewicz University
3	1998-2000	Head of Optoelectronic laboratory	Department of Electronic and Microelectronic	Kyrgyz State National University
4	1997-1998	Technical staff on engineer position	Department of Electronic and Microelectronic	Kyrgyz State National University
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## 3. Participation in Research Projects (over the last 5 years)

№	Years	Position / Responsibility	Project Title	Donor Organization
1	2000-2003	researcher	Investigations of the structure and molecular dynamics of polymer-fillers with the use of nuclear magnetic resonance methods	The Committee of Scientific Research,

				Poland.
2	2004-2011	researcher	Grant SoftComp (6th Framework Program), Soft Matter Composites - An Approach to Nanoscale Functional Materials	6th Framework Program, EU
3	2009-2012	researcher	<i>The influence of the structure and molecular dynamics of new like-star polymer systems on their self-assembled properties.</i>	National Science Centre, Poland.
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#### 4. List of Publications in the International Peer Reviewed Journals (over the last 5 years) <sup>9</sup>

№	Publication Title	Journal title, series, volume issue (publication date): page (s) or, book / monograph title, edition #, series publisher, city, year published
1	Molecular dynamics in Cyclic Olefin Copolymer	Vol. 108 (2005) ACTA PHYSICA POLONICA A No. 2
2	Molecular dynamics of Podand studied by Broadband Dielectric and Nuclear Magnetic Resonance Spectroscopies	MACROMOLECULAR CHEM. & PHYS. 208 2121-2127(2007)
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#### 5. Participation in International Forums/Conferences (up to 5 events)

№	Year	Event title	Venue	Presentation title
1	2003	XX International Seminar RAMIS'03	24-26 April, 2003 Poznan, Poland	Mixtures of Liquid Crystals 8CB and 8OCB, as studied by NMR, DSC and Polarized Light Microscopy
2	2005	MPG/MOEL – Symposium, Magnetic Resonance in Physics, Chemistry, Biology, and Medicine	Berlin / Dresden, 22. – 25. Mai, Germany	Structure and molecular dynamics in Thermoplastic Olefin Polymers as Studied by NMR
3	2006	Nuclear Magnetic Resonance in Condensed Matter, 3 <sup>rd</sup> Meeting „NMR in Heterogeneous Systems	Saint Petersburg, Russia, 9-13 July, NMRCM 2006	Dielectric Spectroscopy and <sup>1</sup> H NMR Relaxometry in semi-crystalline Poly(Ethylene Oxide)
4	2007	Ampere NMR School	24-30 VI 2007, Bukowina Tatrzańska, Poland	Molecular Dynamics of P-[O-(CH <sub>2</sub> CH <sub>2</sub> O) <sub>15</sub> -CH <sub>3</sub> ] <sub>3</sub> and P-[O-(CH <sub>2</sub> ) <sub>17</sub> -CH <sub>3</sub> ] <sub>3</sub> Podand Supramolecular Ligand systems studied by NMR and BD Spectroscopy
5	2008	5 <sup>th</sup> International Conference on “Broadband Dielectric Spectroscopy And Its Applications	26-29 VIII 2008, Lyon, France	NMR Spectroscopy, Differential Scanning Calorimetry and Polarized Light Microscopy in Octylcyanobiphenyl and Octyloxycyanobiphenyl liquid crystal mixtures

#### 6. List of Patents (up to 5 patents)

№	Date	Title of Invention	Patent-granting Organization, Country
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<sup>9</sup> It is mandatory to provide a resume of the paper in English in case it isn't published in international peer reviewed journals and the language of publication was other than English (i.e. Georgian, Russian, etc). This refers to principal investigators publications only.

**7. Additional Information (International Awards, Fellowships, etc.)**

Since 2007 I cooperate with the Erasmus Mundus office of Adam Mickiewicz University (Poland) for master and PhD scholarships students as a member of the guide staff.