Update: April 25, 2017

CURRICULUM VITAE

M.Sc M.A. Sebastián Basterrech, Ph.D.

Personal information
Birth: March 20, 1979.
Nationality: Italy and Uruguay
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Address: Karlovo náměstí 13, 121 35
Prague 2, Ostrava, Czech Republic
`Sebastian.Basterrech@fel.cvut.cz`

ORCID Id: $C - 9072 - 2014$
Scopus author Id: 36719811900
Google scholar: `http://goo.gl/wNC9C`
Scopus citations: 29, h-index: 4
Google scholar citations: 119, h-index: 6

RESEARCH INTERESTS

Numerical Optimization, Dynamical Systems, Neural Computing, Supervised Learning, Queueing Theory, Time-Series Problems, Sequential Learning, Clustering, Networking.

CURRENT POSITION

Researcher, *Feb. 2017 - Present*
(Czech denomination: *Vědecký pracovník*)
Department of Computer Science, Faculty of Electrical Engineering
Czech Technical University, Prague, Czech Republic (`http://cs.felk.cvut.cz`).
Advisor: Professor Michal Pěchouček (`pechoucek@fel.cvut.cz`).
Main research topics: Neural Computing, Machine Learning, Malware Detection.

ACADEMIC BACKGROUND

Researcher, *Jan. 2016 - Jan. 2017*
(Czech denomination: *Pracovník pro vědu a výzkum*)
Department of Computer Science,
Faculty of Electrical Engineering and Computer Science (`http://www.fei.vsb.cz/en`),
VŠB-Technical University of Ostrava, Ostrava, Czech Republic.
Advisor: Professor Vaclav Snašel (`vaclav.snasel@vsb.cz`).
Main research topics: Big Data, Neural Computing, Soft-Computing, Time-series problems.

Post-doctoral researcher, *May. 2013 – Dec. 2015*
IT4I, National Supercomputing Center (`http://www.it4i.cz/?lang=en`)
Ostrava, Czech Republic.
Advisor: Professor Vaclav Snasel.
Main research topics: Big Data, Neural Networks, Soft-Computing, Time-series problem.

Ph.D. in Computer Science, *Jan. 2009 – Nov. 2012*
Institut National de Recherche en Informatique et Automatique (INRIA) and
University of Rennes I, France. Doctoral research fellowship of INRIA-Rennes, France.
Advisor: Professor Gerardo Rubino.
Team: Dionysos, INRIA-Rennes, France (`http://www.inria.fr/en/teams/dionysos`)
Title: *Learning with Random Neural Networks and Reservoir Computing models.*
Graduation date: November 15, 2012. Mention: *Très honorable* (French scale).
Fields of specialization: Machine Learning Tools, Neural Computing,
Clustering, Bio-inspired Algorithms, Numerical Optimization Algorithms.

M.A. in Computer Arts, *Sep. 2011 – May 2013*
(French denomination: *Master Arts Lettres Languages, Mention Arts*)
University of Rennes II, France.
Advisors: Professor Boris Bossis and Associate Professor Joël Laurent.
Fields of specialization: Visual Arts, Digital Arts, Experimental Aesthetics and Technogenesis.

M.Sc in Applied Mathematics, *Sep. 2007 – Sep. 2008*
(French denomination: *Master Sciences, Mention Mathématiques et applications*)
Faculty of Sciences, Aix-Marseille University, France.
Advisors: Professor Denys Pommeret and Associate Professor Badih Ghattas.
Fields of specialization: Bioinformatics, Ensemble Predictor Models.

Computer Engineering, *Mar. 1997 – Jun. 2006*
Student of Engineer in Computer Science (Not yet graduated),
Faculty of Engineering. University of the Republic, Uruguay.

FELLOWSHIPS

INRIA fellow, INRIA-Rennes, France, *January 2009*
Doctoral grant of 39 months, contact: Prof. G. Rubino (Rubino@inria.fr)

PUBLICATIONS

List of publications: please find attached two documents, one contains a selection of 10 publications, another one contains full publication list.

Summary of publications:
Journals with impact factor: 5 accepted articles
Peer-review journals without impact factor: 3 accepted articles.
IEEE Conferences: 14 accepted articles.
Springer Proceedings in Computer Sciences Fields: 11 accepted articles.
ACM Digital Library: 1 accepted article.
Other International Conferences, Symposiums and Workshops: 6 accepted articles.

Cooperation network: publications with researchers from 11 countries of 3 continents.

Guest editor

- Special Issue On: Intelligent Solutions to Engineering Design Problems. International Journal of Applied Metaheuristic Computing (`goo.gl/vkuoC8`).

MEMBERSHIPS

- Since Feb. 2017: regular member of the Neural Networks Society (https://www.inns.org).
- Since Apr. 2016: membership of TC on IEEE Systems, Man and Cybernetics Society, Soft Computing (http://goo.gl/qU6tyg).

HONORY/ADJUNCT APPOINTMENTS

Adjunct Professor (external member), *Jan. 2016 - Present*
(Spanish denomination: *Profesor Adjunto Libre* Grado 3)
Faculty of Engineering, (https://www.fing.edu.uy/inco),
University of the Republic, Montevideo, Uruguay
Head of team: Prof. Hector Cancela (cancela@fing.edu.uy)
Main research topics: Operational research, Data Analysis, Neural Computing.

Adjunct Professor (external member), *Sep. 2016 - Present*
Computer Science and Engineering, Amity School of Engineering and Technology
Amity University Rajasthan, Jaipur, India (http://www.amity.edu)
Head of team: Prof. Tarun K. Sharma (tksharma@jpr.amity.edu)
Main research topics: Machine Learning, Data Analysis, Neural Computing.

EXTERNAL EVALUATIONS

Technical reviews for International journals

- Information Sciences, Elsevier (http://goo.gl/GZl4W1): 2 completed assignment.
- Neural Networks, Elsevier (http://goo.gl/PiyORv): 4 completed assignment.
- Neurocomputing, Elsevier (http://goo.gl/VKLF75): 7 completed assignments.
- Neural Computing and Applications, Springer (http://goo.gl/m8b7NL): 1 completed assignment.
- Pattern Analysis and Applications, Springer (http://goo.gl/pTFNNC): 22 completed assignments.
- Applied Soft Computing, Elsevier (goo.gl/AOPblJ): 2 completed assignments.
- International Journal of Geo-Information, MDPI AG, Basel, Switzerland (http://goo.gl/CX8QlS): 1 completed assignment.
- Leonardo, MIT Press Journal, MIT, USA(http://www.mitpressjournals.org/loi/leon): 2 completed assignment.
- Ingeniare, Journal of Engineering research of Chile, Chile (http://www.ingeniare.cl/index.php?lang=es): 1 completed assignment.

External evaluations for research agencies

- Research Agency of Uruguay (*Agencia Nacional de Investigación e Innovación (ANII) del Uruguay)*: 2 evaluated projects during 2016 and 2017.
- Program for Developing Basic Research of Uruguay (*Programa de Desarrollo de las Ciencias Básicas (PEDECIBA), Universidad de la República, Ministerio de Educación, Uruguay)*:: 1 evaluated project during 2016.

International Conference Organization

- Workshop Chair, Intelligent Systems Technologies and Applications (ISTA'2017), Manipal Institute of Technology, Manipal, India (goo.gl/pOBh4Y).

- I have been TPC member of 14 International conferences (indexed by Scopus, ISI Thomson Reuters (WoS)).

International Conference Program Committee Participation

- I have been TPC member of 14 International conferences (indexed by Scopus, ISI Thomson Reuters (WoS)).

INVITED SPEAKER

Workshops:

– International ACM workshop on "Neural Networks", organized by ACM and Indian Institute of Information Technology and Management-Kerala (IIITM-K), Trivandrum, INDIA, August 27, 2016. Information available in: `http://www.iiitmk.ac.in/acm-tvm/neural.html`.

– International Workshop on "Hybrid Computing", organized by Raisoni College of Engineering Amity University, Nagpur, India, August 17-18, 2016. Organizer contact: Prof. Preeti Bajaj (principal.ghrce@raisoni.net).

– International Workshop on "Neural Networks: New trends and challenges", organized by Amity University, Jaipur India, August 8-9, 2016. Organizer contact: Prof. Tarun Sharma (tksharma@jpr.amity.edu).

Seminars:

– Seminars about "Recurrent Neural Networks" presentation for PhD students and researchers, Department of Computer Science, Faculty of Electrical Engineering, Czech Technical University, Prague, Czech Republic, November 2016. Contact: Prof. M. Pěchouček (pechoucek@fel.cvut.cz).

– Two seminars about "Neural Computation" for Master students and PhD students, Department of Computer Science and Electronics, Kyushu Institute of Technology, Iizuka, Japan, February, 2015. Organizer contact: Prof. Mario Koeppen (mkoeppen@ieee.org).

– Seminar about "Metaheuristic techniques for improving Recurrent Neural Networks" presentation for PhD students and researchers, Institute of Computer Science, Academy of Sciences of the Czech Republic, Prague, Czech Republic, November 2014. Organizer contact: Prof. Dusan Husek (dusan@cs.cas.cz).

INTERNATIONAL RESEARCH EXPERIENCE

– Research stay in the Department of Computer Science *Jan – Mar 2015*
and Electronics, Kyushu Institute of Technology, Iizuka, Japan.
Advisor: Prof. Mario Köeppen.
Subject: Pattern recognition on images taken by thermal imaging camera.
Production: an accepted article in IEEE SMC'15 that is the main conference of the IEEE Systems, Man, and Cybernetics Society.

– Research stay in the Institute of Computer Science *Sep – Dec 2014*
Academy of Sciences of the Czech Republic, Prague, Czech Republic
Advisor: Prof. Dusan Husek.
Subject: Feature Selection for Brain Computer Interface.
Production: An accepted article in International Conference on Artificial Intelligence and Soft Computing.

– Internship in the Department of Computing and *Jan. – Jun. 2011*
Information Systems, University of the West of Scotland, Scotland.
Advisor: Prof. Colin Fyfe.
Subject: Reservoir Computing and Topographic Maps.
Production: a paper available in the IEEE Computer Society Digital Library and an article in a proceedings collection.

– Internship in the Dyonisos Team, *May – Dec. 2008*
INRIA-Rennes, Brittany. France. Advisor: Prof. Gerardo Rubino.
Subject : Pattern recognition using Neural Networks.

TEACHING EXPERIENCE

Please find attached a document with the teaching statment.

PARTICIPATION IN FUNDED RESEARCH PROJECTS

– **SGS - Complex System Analysis**,
Principal investigator: The project was in the area of performance and dependability evaluation in networks. The goal was to build a large scale database of problems and to compute their exact solutions using the resources of the National Supercomputing Center, Czech Republic. In the framework of this project, I supervise 6 PhD students of the VSB-Technical University of Ostrava. End of the project: October, 2015. Duration:10 months. Funding: 387000 Kc (around 14500euros).

– **National Supercomputing Center, Czech Republic**
Team member: the project *New creative teams in priorities of scientific research*, reg. no. CZ.1.07/2.3.00/30.0055, supported by Operational Programme Education for Competitiveness and co-financed by the European Social Fund and the state budget of the Czech Republic. Further information at: `http://www.it4i.cz/en/index.php`. Years participation: 2013-2015. Part of my research during this time has been supported by this project.

– **ECOS project**
Team member: *Mesh Wireless Networks and P2P multimedia applications: tools for guaranteeing Quality Of Experience*. Partners: INRIA and the University of the Republic, Uruguay. Funding: 15 000 euros. This is a 3-year project (2009-2011) between France and Uruguay. The project concerns the study of tools allowing to reach good levels in the Quality of Experience in P2P networks for multimedia purposes, when the transport infrastructure is a mesh wireless network.

– **STIC AmSud project**
Team member: *"Performance Evaluation and Design of Optical and Wireless Networks"*. Partners: Santa María University and Adolfo Ibáñez University in Chile, University of the Republic of Uruguay, Joseph Fourier University, University of Pau and Pays de l'Adour and INRIA in France. Funding: 11 000 euros. This is a 2-year project (2009-2010) between Chile, France and Uruguay. The goal is the development of models and analysis tools for the study of performance aspects in networks, mainly for optical and for wireless structures. This project had also the goal of contributing to prepare the future cooperation between INRIA-Rennes and Chilean universities through the common CIRIC center.

– **Euro-NF project**
Team member: "European Network of the Future". Funding: 83 158 euros. Euro-NF is a Network of Excellence on many aspects of future networks, integrating 35 institutions (from academia and industry), coming from 16 countries. Its main target is to integrate the research effort of the partners to be a source of innovation and a think tank on possible scientific, technological and socio–economic trajectories towards the network of the future. It has started in January 2008 and is ending in June 2012 (see `http://euronf.enst.fr/en_accueil.html`) and is a follow-up of Euro-FGI.

PARTICIPATION IN NON-FUNDED RESEARCH PROJECTS

– **EEG feature selection for Brain Computer Interface**
Principal Investigator: This project was an international collaboration between Institute of Higher Nervous Activity and Neurophysiology, RAS, Moscow, Russia, Institute of Computer Sciences of the Czech Republic, Prague, Czech Republic, and VŠB-Technical University of Ostrava, Ostrava-Poruba, Czech Republic. End of the project: August, 2015. Duration: 6 months. The Brain Computer Interface (BCI) system is useful for analysing, assisting and repairing human cognitive and sensory-motor functions. The system contains a Machine Learning classifier that uses information from the brain. The feature selection for building this classifier is a hard task that requires large amounts of computing. We solve that problem using metaheuristic optimisation techniques. There are 5 researchers involved in this project. We use the computational resources of the National Supercomputing Center, Czech Republic for developing this project (110,000 core/hours).

– **DPDM1-Database of Performance and Dependability Models 1**
Principal Investigator: This project was an international collaboration between INRIA-Rennes, France and VSB-Technical University of Ostrava. End of the project: March, 2015. Duration: 6 months. Project in the area of networking evaluation. There are 6 researchers working in this project. We use the computational resources of the National Supercomputing Center, Czech Republic for developing the project (55,000 core/hours).

Languages

- Spanish: native.
- English: fluent. I worked on my PhD thesis in an English-speaking environment for almost 4 years. Currently, I am working in an English environment.
- French: fluent. I lived in France for 5 years, completed two Masters in a French environment.
- Czech: basic. I have lived in Czech Republic for almost 4 years, but my Czech language is still basic.

List of 10 selected publications

M.Sc M.A. Sebastián Basterrech, Ph.D.[1]

(Update: March 31, 2017)

[1] Sebastián Basterrech, Jan Janoušek, and Václav Snášel. (2016). A Performance Study of Random Neural Network as Supervised Learning Tool Using CUDA. *Journal of Internet Technology*, 17 (4), 771–778, doi: 10.6138/JIT.2016.17.4.20141014d.

[2] Sebastián Basterrech and Gerardo Rubino. (2015). Random Neural Network as Supervised Learning Tool. *Neural Network World*, 25(5), 457–499, doi: 10.14311/NNW.2015.25.024.

[3] Andrea Mesa, Sebastián Basterrech, Gustavo Guerberoff, and Fernando Alvarez-Valin. (2015). Hidden Markov models for gene sequence classification. *Pattern Analysis and Applications*, 19 (3), 793–805, doi: 10.1007/s10044-015-0508-9.

[4] Sebastián Basterrech, Samir Mohamed, Gerardo Rubino, and Mostafa Soliman. (2011). Levenberg-Marquardt Training Algorithms for Random Neural Networks. *Computer Journal*, 54 (1), 125–135, doi:10.1093/comjnl/bxp101.

[5] Claudio Aracena, Sebastián Basterrech, Juan Velasquez, and Václav Snášel. (2015). Neural Networks for Emotion Recognition Based on Eye Tracking Data. In *IEEE International Conference on Systems, Man, and Cybernetics (SMC'15)*, 2632–2637, doi: 10.1109/SMC.2015.460.

[6] Sebastián Basterrech, Kei Ohnishi, and Mario Koeppen. (2015). Neural Signature of Efficiency Relations. In *Proceedings of IEEE International Conference on Systems, Man, and Cybernetics (SMC'15)*, 2090–2095, doi: 10.1007/978-3-319-27221-4_20.

[7] Sebastián Basterrech, Pavel Bobrov, Alexander Frolov, and Dušan Husek. (2015). Nature-inspired Algorithms for Selecting EEG Sources for Motor Imagery Based BCI. In *Artificial Intelligence and Soft Computing, of the series Lecture Notes in Computer Science, Springer International Publishing*, vol. 9120, 79–90, doi:10.1007/978-3-319-19369-4_8.

[8] Sebastián Basterrech and Václav Snášel. (2013) Initializing Reservoirs With Exhibitory And Inhibitory Signals Using Unsupervised Learning Techniques. In *International Symposium on Information and Communication Technology (SoICT), ACM Digital Library*, 53–60, doi: 10.1145/2542050.2542087.

[9] Sebastián Basterrech and Gerardo Rubino. (2013). Echo State Queueing Network: A new Reservoir Computing Learning Tool. In *Proceedings of the 10th IEEE Consumer Communications and Networking Conference (CCNC'13)*, 118-123, doi:10.1109/CCNC.2013.6488435.

[10] Sebastián Basterrech, Colin Fyfe, and Gerardo Rubino. (2011). Self-organizing Maps and Scale- invariant Maps in Echo State Networks. In *Proceedings of the 11th IEEE International Conference on Intelligent Systems Design and Applications (ISDA 2011)*, 94–99, doi: 10.1109/ISDA.2011.6121637.

[1]Department of Computer Science, Faculty of Electrical Engineering Czech Technical University, Prague, Czech Republic. Email: Sebastian.Basterrech@fel.cvut.cz, Scopus author id: 36719811900.

Academic references

Sebastián Basterrech[1]

Professor Gerado Rubino
Dyonisos Project, INRIA-Rennes.
Head of team.
G. Leclerc 263, Rennes, France.
zip code: 35042.
phone: +33(0)299847296.
email: `Gerardo.Rubino@inria.fr`
Note: Prof. Rubino has been my PhD supervisor.

Professor Mario Koeppen
Kyushu Institute of Technology.
Head of team.
Kawazu, Iizuka, Fukuoka, Japan.
zip code: $820 - 8502$.
phone: +81948297945.
email: `mkoeppen@ieee.org`
Note: Prof. Koeppen has been my supervisor during a research stay in 2015.

Professor Vaclav Snašel
Faculty of Electrical Engineering and Computer Science.
Dean at the Faculty, VŠB-Technical University of Ostrava.
17.listopadu 15/2172, Ostrava Pruba, Czech Republic.
zip code: 70833.
phone: +42(0)597326000.
email: `Vaclav.Snasel@vsb.cz`
Note: Prof. Snašel has been my supervisor during my postdoc in 2013-2016.

Professor (retired) Colin Fyfe
Former Professor at the West University of Scotland, Paisley, Scotland.
Currently he is a Visiting Professor at Aston University, Birmingham, England
email: `veryhappycolin@hotmail.com`
Note: Professor Fyfe has been my supervisor during a research internship in 2011.
In addition he was jury member during my Ph.D dissertation.

[1]Department of Computer Science, Faculty of Electrical Engineering Czech Technical University, Prague, Czech Republic. Email: `Sebastian.Basterrech@fel.cvut.cz`, Scopus author id: 36719811900.

Statement of teaching activities

M.Sc M.A. Sebastián Basterrech, Ph.D.[1]

Student guidance

- Ph.D. thesis:
  - Tomas Burianek, PhD student in Computer Science, VSB-Technical University of Ostrava, Czech Republic (`tomas.burianek.st1@vsb.cz`). Thesis subject: *Self-organization in Recurrent Neural Networks*. I am co-supervisor of the PhD thesis(Tutor specialist), main supervisor is Prof. V. Snášel (`vaclav.snasel@vsb.cz`). Estimated date of final thesis dissertation: September, 2017.
- Master students (I am the main supervisor of the following cases):
  - Petr Prokop, Master student in Computer Science, VSB-Technical University of Ostrava, Czech Republic (`petr.prokop.st1@vsb.cz`). Thesis subject: *Application of Recurrent Neural Networks for modelling Financial Time-series*. Estimated ending date of the Master thesis: June, 2018.
  - Hikmat Dashdamirov, Master student in Computer Science, VSB-Technical University of Ostrava, Czech Republic (`hikmat.dashdamirov.st@vsb.cz`). Thesis subject: *Emotion Recognition using EEG signals and Recurrent Neural Networks*. Estimated ending date of the Master thesis: June, 2018.
- Bachelor students (I am the main supervisor of the following cases):
  - Matus Hromulak, Final project of bachelor in Computer Science, VSB-Technical University of Ostrava, Czech Republic (`Matus.hromulak.st@vsb.cz`). Thesis subject: *Progressive Neural Networks and their applications*. Estimated ending date of Bachelor project: June, 2017.
  - Vu Lam DANG, Final project of bachelor in Computer Science, University of Science and Technology of Hanoi (USTH), Hanoi, Czech Republic (`lam.dv@live.com`). Thesis subject: *Sequential Information Processing using Echo State Queuing Networks*. Estimated ending date of Bachelor project: August, 2017. The local responsible of this thesis in USTH is Prof. Doan Nhat Quang (`doan-nhat.quang@usth.edu.vn`).

[1]Department of Computer Science, Faculty of Electrical Engineering, Czech Technical University, Prague, Czech Republic. Email: `Sebastian.Basterrech@fel.cvut.cz`, Scopus author id: 36719811900.

Teaching activities

- Lectures for undergraduate students, *March 2017*
  University of Science and Technology of Hanoi, Hanoi, Vietnam
  Invited for giving a course about **Graph Theory** (35 hours)
  Addressed to students of the last year of B.S. in Computer and Electronic Engineering.
  Responsible of theoretical lectures and practical activities.
  I was the only professor of this course, it was addressed to 21 students.

- Lectures for master students, *Dec. 2016*
  Republic University, Montevideo, Uruguay
  Invited for giving a course about **Neural Networks** (15 hours, 5 credits).
  Addressed to master students, responsible of theoretical lectures and practical activities.
  The course was addressed to 25 students.

- Lectures for undergraduate students, *Nov 2015*
  University of Science and Technology of Hanoi, Hanoi, Vietnam
  Course of **Artificial Intelligence and Machine Learning** (40 hours)
  Addressed to students of the last year of B.S. in Computer and Electronic Engineering.
  Responsible of theoretical lectures and practical activities.
  I was the only professor of this course, it was addressed to 19 students.

- Lectures for undergraduate students, *Oct 2014*
  University of Science and Technology of Hanoi, Hanoi, Vietnam
  Course of **Artificial Intelligence and Machine Learning** (36 hours)
  Addressed to students of the last year of B.S. in Computer and Electronic Engineering.
  Responsible of theoretical lectures and practical activities.
  I was the only professor of this course, it was addressed to 17 students.

- Teaching for undergraduate courses, *Second semester, 2014*
  VŠB-Technical University of Ostrava, Ostrava, Czech Republic.
  Course of **Data Compression**
  Corresponding to second and third year of B.S. in Computer and Electronic Engineering.
  Responsible of theoretical lectures and practical activities.

- Teaching for undergraduate courses, *First semester, 2013*
  VŠB-Technical University of Ostrava, Ostrava, Czech Republic.
  Course of Information Knowledgment Processing
  Corresponding to second and third year of B.S. in Computer and Electronic Engineering.
  Responsible of theoretical lectures and practical activities.

- Teaching assistant for undergraduate courses, *Oct. 2003 – May 2007*
  Faculty of Engineering. University of the Republic, Uruguay.
  Basic courses of **Discrete Mathematics, Algebra, Probability and Statistics** corresponding to first and second year of B.S. in Computer and Electronic Engineering.
  I was lecturer of the practical activities and laboratories.

Full list of publications

M.Sc M.A. Sebastián Basterrech, Ph.D.[1]

(Update: March 31, 2017)

Articles in international journals with impact factor

[1] Sebastián Basterrech and Gerardo Rubino. (2017). Echo State Queueing Networks: a combination of Reservoir Computing and Random Neural Networks *Probability in the Engineering and Informational Sciences*. Note: Recently accepted article, acceptance letter is attached.

[2] Sebastián Basterrech, Jan Janoušek, and Václav Snášel. (2016). A Performance Study of Random Neural Network as Supervised Learning Tool Using CUDA. *Journal of Internet Technology*, 17 (4), 771–778, doi: 10.6138/JIT.2016.17.4.20141014d.

[3] Sebastián Basterrech and Gerardo Rubino. (2015). Random Neural Network as Supervised Learning Tool. *Neural Network World*, 25(5), 457–499, doi: 10.14311/NNW.2015.25.024.

[4] Andrea Mesa, Sebastián Basterrech, Gustavo Guerberoff, and Fernando Alvarez-Valin. (2015). Hidden Markov models for gene sequence classification. *Pattern Analysis and Applications*, 19 (3), 793–805, doi: 10.1007/s10044-015-0508-9.

[5] Sebastián Basterrech, Samir Mohamed, Gerardo Rubino, and Mostafa Soliman. (2011). Levenberg-Marquardt Training Algorithms for Random Neural Networks. *Computer Journal*, 54 (1), 125–135, doi:10.1093/comjnl/bxp101.

Peer reviewed articles in journals without impact factor

[1] Francois Despaux and Sebastián Basterrech. (2016). Multi-trip Vehicle Routing Problem with Time Windows and Heterogeneous Fleet. *International Journal of Computer Information Systems and Industrial Management Applications*, vol. 8, 355–363. Available at: `http://www.mirlabs.org/ijcisim/volume_8.html`.

[2] Sebastián Basterrech. (2014). An Empirical Study of the L2-Boost Technique with Echo State Networks. *Journal of Network and Innovative Computing*, 2 (1),120–127. Available at: `http://www.mirlabs.net/jnic/secured/Volume2-Issue1/Volume2-Issue1.html`

[3] Sebastián Basterrech and Gerardo Rubino. (2013). Real-time Estimation of Speech Quality Through the Internet using Echo State Networks. *Journal of Advanced in Computer Networks*, 1 (3), 183–188. Available at: `http://www.jacn.net/list-30-1.html`.

International conferences

[1] Sebastián Basterrech. (2017). Empirical Analysis of the Necessary and Sufficient Conditions of the Echo State Property. Recently accepted article for the *Intelligent Joint Conference in Neural Networks (IJCNN'2017)*, May, 2017, Alaska, USA. Accepted letter is attached. Manuscript draft is available in: `https://arxiv.org/pdf/1703.06664.pdf`.

[1]Department of Computer Science, Faculty of Electrical Engineering Czech Technical University, Prague, Czech Republic. Email: Sebastian.Basterrech@fel.cvut.cz, Scopus author id: 36719811900.

[2] Sebastián Basterrech and Varun Ojha. (2016). Estimating Human Activities from Smartwatches with Feedforward Neural Networks. In *Proceedings of the IEEE Third European Network Intelligence Conference (ENIC 2016)*, 217–223, doi: 10.1109/ENIC.2016.039.

[3] Sebastián Basterrech. (2016). Estimating Human Activities from Smartwatches with Feedforward Neural Networks. In *Proceedings of Intelligent Data Analysis and Applications: Proceedings of the Third Euro-China Conference on Intelligent Data Analysis and Applications, ECC 2016*, 51–57, doi: 10.1007/978-3-319-48499-0_7.

[4] Sebastián Basterrech and Václav Snášel. (2016). Feature Selection Using a Genetic Algorithm for Solar Power Prediction. In *Proceedings of the First International Scientific Conference "Intelligent Information Technologies for Industry" (IITI'16): Volume 1*, 409–419, doi: 10.1007/978-3-319-33609-1_37.

[5] Sebastián Basterrech. (2016). Experimental Analysis of Forecasting Solar Irradiance with Echo State Networks and Simulating Annealing. In *Artificial Intelligence and Soft Computing: 15th International Conference, ICAISC 2016, Zakopane, Poland, June 12-16, 2016, Proceedings, Part I*, 15–24, doi: 10.1007/978-3-319-39378-0_2.

[6] Sebastián Basterrech, Gerardo Rubino, and Václav Snášel. (2015). Sensitivity Analysis of Echo State Networks for Forecasting Pseudo-periodic Time Series. In *Proceedings of IEEE Soft Computing and Pattern Recogntion (SocPar'15)*, 328–333, doi: 10.1109/SOCPAR.2015.7492768.

[7] Sebastián Basterrech, Gerardo Rubino, and Václav Snášel. (2016). Experimental Analysis of a Hybrid Reservoir Computing Technique. In *Chapter Hybrid Intelligent Systems, of the series Advances in Intelligent Systems and Computing, Springer International Publishing*, vol. 420, 237–247, doi: 10.1007/978-3-319-27221-4_20.

[8] Claudio Aracena, Sebastián Basterrech, Juan Velasquez, and Václav Snášel. (2015). Neural Networks for Emotion Recognition Based on Eye Tracking Data. In *IEEE International Conference on Systems, Man, and Cybernetics (SMC'15)*, 2632–2637, doi: 10.1109/SMC.2015.460.

[9] Sebastián Basterrech, Kei Ohnishi, and Mario Koeppen. (2015). Neural Signature of Efficiency Relations. In *Proceedings of IEEE International Conference on Systems, Man, and Cybernetics (SMC'15)*, 2090–2095, doi: 10.1007/978-3-319-27221-4_20.

[10] Sebastián Basterrech, Pavel Bobrov, Alexander Frolov, and Dušan Husek. (2015). Nature-inspired Algorithms for Selecting EEG Sources for Motor Imagery Based BCI. In *Artificial Intelligence and Soft Computing, of the series Lecture Notes in Computer Science, Springer International Publishing*, vol. 9120, 79–90, doi:10.1007/978-3-319-19369-4_8.

[11] Sebastián Basterrech, Andrea Mesa, and Ngoc-Tu Dinh. (2015). Generalized Linear Models Applied for Skin Identification in Image Processing. In *Intelligent Data Analysis and Applications, of the series Advances in Intelligent Systems and Computing, Springer International Publishing*, vol. 370, 97–107, doi: 10.1007/978-3-319-21206-7_9.

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National Conferences, Workshops and Meetings

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G. Rubino
DR INRIA
Scientific responsible of the Dionysos research team
INRIA Rennes

Rennes, September 29, 2016

Object: reference letter for Sebastián Basterrech

I met Sebastian Basterrech several years ago, when he joined our team for the preparation of his PhD in computer science. He defended it in 2012, and since then, we kept collaborating in different research projects. Sebastián's thesis was on statistical techniques problems, both methodological and related to families of applications. We continuing collaborating on learning methods mainly, together with performing studies about several specific modeling issues concerning different application areas. In the sequel, I briefly describe these past activities that allowed to know each other and, from my side, to have a high opinion of the person and of his capabilities in research and in collaborative work with other people.

Sebastián Basterrech is a very good researcher, who showed a strong investment during his doctoral work, and who also exhibited a significant amount of creativity and initiative during his sojourn at INRIA. For instance, he developed three sets of different works and contributions during his PhD, and one of these, his work on Echo State Networks, comes from proposals he made alone during the thesis. He looked for experts for developing his initial ideas, found them at Glasgow, in the team of Professor Colin Fyfe, and went there for several months to learn from them and to collaborate with Colin and his team. He learned from that group about Reservoir Computing models in general, and mixed that knowledge with the tools he was developing here, with nice results at the end.

Let me group the topics in which have been collaborating during these years in three sets.

- **Results concerning Random Neural Networks (RNN)** Random Neural Networks are mathematical object inspired from the classic Neural Networks and from queuing systems. There are two types of weights connections, stochastic spikes among the neurons and the activation function has a particular form. For this reason, to adapt the model for learning can be hard. So far, it was

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developed a learning algorithm based on the gradient of a quadratic error. We developed Quasi-Newton methods for the use of Random Neural Networks in supervised learning problems. In particular we adapted Levenberg-Marquardt methods and some of their variations.

- **Results concerning Recurrent Neural Networks** As previously mentioned, we worked together on a specific type of Recurrent Neural Network called Reservoir Computing. In this family, some network's parameters are fixed during the learning process (in general they are randomly initialized following some algebraic restriction in order to guarantee the stability of the recurrent network part, but they learn nothing). We presented a new initialization method for the static part of the model (the random one), which uses non-supervised learning techniques (Self-organized Maps and Scale Invariant Maps). Our approach consists in two-phases: the first one is a non-supervised process that focuses on adjusting the static recurrent part; the second one is a supervised phase which computes the rest of the model's parameters. In another work, we introduced a new parallel distributed system that combines ideas from queuing theory and and from Reservoir Computing models, which we called Echo State Queuing Network. The method has shown competitive performance with respect to other techniques in the area.
- **Applications** We applied different techniques from Machine Learning to different problems. Sebastian participated to our PSQA project for the development of accurate approximations to subjective tests concerning applications or services designed to operate on the Internet, and built around video or voice content distribution. For instance, we designed a device for predicting the Speech Quality over the Internet in real-time contexts. For that purpose, we used several type of statistical specific learning tools. We also integrated our Levenberg-Marquardt procedure for learning with Random Neural Networks inside our PSQA set of tools.

See below a list of our main common results coming from his PhD period, showing the qualities of Sebastián for research cooperation, together with his ideas, many of those papers come from his own initiatives to attack some specific research problem.

Sebastián Basterrech, Samir Mohamed, Gerardo Rubino, and Mostafa Soliman. "**Levenberg Marquardt Training Algorithms for Random Neural Networks**". *Computer Journal*, 54(1):125–135, January 2011. doi:10.1093/comjnl/bxp101.

Sebastián Basterrech, Colin Fyfe, and Gerardo Rubino. "**Self-organizing Maps and Scale- invariant Maps in Echo State Networks**". In *11th International Conference on Intelligent Systems Design and Applications, ISDA 2011, Córdoba, Spain, November 22-24, 2011*, pages 94–99, November 2011. doi: 10.1109/ISDA.2011.6121637.

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Sebastián Basterrech, Gerardo Rubino, and Martin Varela. "**Single-sided Real-time PESQ Score Estimation**". In *In Proceeding of Measurement of Speech, Audio and Video Quality in Networks (MESAQIN'09)*, pages 94 –99, Prague, Czech Republic, June 2009.

Apart from his scientific skills, he is a very friendly person and he adapts perfectly well to research work inside a team. So, again, I wholeheartedly support his application for a post-doc position at your university.

Best regards,

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Gerardo Rubino

Senior Researcher at INRIA, France

sebastian basterrech <sebastian.basterrech@agents.fel.cvut.cz>

Probability in the Engineering and Informational Sciences - Decision on PES-RA-17-023.R1

1 message

Probability in the Engineering and Informational Sciences <onbehalfof+sbloor+cambridge.org@manuscriptcentral.com>

Mon, Mar 27, 2017 at 12:37 PM

Reply-To: sbloor@cambridge.org
To: Sebastian.Basterrech@agents.fel.cvut.cz

27-Mar-2017

Dear Dr. Basterrech,

Thank you for submitting the final version of your manuscript entitled "Echo State Queueing Networks: a combination of Reservoir Computing and
Random Neural Networks", which is acceptable for publication in Probability in the Engineering and Informational Sciences in its current form.

If you have not yet done so, please complete and return the journal's copyright transfer form as soon as possible:

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Sincerely,
Susie Bloor
Administrator, Probability in the Engineering and Informational Sciences
sbloor@cambridge.org

sebastian basterrech <sebastian.basterrech@agents.fel.cvut.cz>

IJCNN 2017 Paper N-0844 Resubmission Confirmation

1 message

Chrisina Jayne <chrisinadraganova@gmail.com> Wed, Feb 22, 2017 at 10:58 AM
Reply-To: Chrisina Jayne <chrisinadraganova@gmail.com>
To: Sebastian.Basterrech@agents.fel.cvut.cz

Dear Colleague,

The final version of your paper number N-0844 was resubmitted successfully to IJCNN 2017. Please use the paper number in all your correspondence.

Your submission was recorded as follows:

Title: Empirical Analysis of the Necessary and Sufficient Conditions of the Echo State Property
Author(s): Sebastian Basterrech
Affiliation(s):
Department of Computer Science, Faculty of Electrical Engineering, Czech Technical University, Prague, Czech Republic
Email(s): Sebastian.Basterrech@agents.fel.cvut.cz

Abstract:
The Echo State Network (ESN) is a specific recurrent network, which has gained popularity during the last years. The model has a recurrent network named reservoir, that is fixed during the learning process. The reservoir is used for transforming the input space in a larger space. A fundamental property that provokes an impact on the model accuracy is the Echo State Property (ESP). There are two main theoretical results related to the ESP. First, a sufficient condition for the ESP existence that involves the singular values of the reservoir matrix. Second, a necessary condition for the ESP. The ESP can be violated according to the spectral radius value of the reservoir matrix. There is a theoretical gap between these necessary and sufficient conditions. This article presents an empirical analysis of the accuracy and the projections of reservoirs that satisfy this theoretical gap. It gives some insights about the generation of the reservoir matrix. From previous works, it is already known that the optimal accuracy is obtained near to the border of stability control of the dynamics. Then, according to our empirical results, we can see that this border seems to be closer to the sufficient conditions than to the necessary conditions of the ESP.

Preferred form of presentation: Oral

Paper Topics:
1i. Reservoir networks (echo-state networks, liquid-state machines, etc.)
1m. Randomized neural networks
2a. Supervised learning

Student Paper: No

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All inquiries should be sent to Chrisina Jayne <chrisinadraganova@gmail.com>.
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We are looking forward to seeing you at IJCNN 2017 (Anchorage, Alaska).

Sincerely, Chrisina Jayne, IJCNN 2017 Program Chair