

Dr. Rosa Filgueira Vicente

Lecturer

Computer Science, University of St Andrews

Group Leader, Systems Research Group (SRG)

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Professional Experience

- Lecturer, University of St Andrews, UK, since February 2022
- Assistant Professor, Heriot-Watt University, UK, March 2021 - February 2022
- Vice President, Applied Research, JP Morgan Chase & Co, UK, October 2020 - March 2021
- Research Fellow, University of Edinburgh, UK, June 2019 - October 2020
- Data Architect, University of Edinburgh, UK, March 2018 - May 2019
- Senior Data Scientist, British Geological Survey, Edinburgh, UK, October 2016 - February 2018
- Senior Research Associate, School of Informatics, University of Edinburgh, June 2011 - October 2016
- Research Assistant and Teaching Fellow, University Carlos III Madrid, Spain, Sept. 2005 - Sept. 2010
- Software Developer, Soluziona, Enterprise Consultancy, Spain, June 2004 - September 2004

Education

- PhD in Computer Science, University Carlos III Madrid, Spain, September 2010
- Master of Technology in Computer Science, University Carlos III, Madrid, Spain, July 2007
- Master in e-Commerce, University Carlos III Madrid, Spain, July 2004
- Master of Computer Science, University of Deusto, Spain, June 2003
- Bachelor of Computer Science, University of Deusto, Spain, June 2001

Visiting Positions and Consultancy Experience

- Honorary Research Fellow, School of Informatics, University of Edinburgh, since April 2021
- Research Visitor, ISI, University of Southern California, October 2017 - December 2017
- Honorary Research Fellow, School of Informatics, University of Edinburgh, January 2017 - March 2018
- Research Visitor, ISI, University of Southern California, Los Angeles, March 2016 - May 2016
- Consultancy Services for Accelogic, Edinburgh, August 2014 - April 2016
- Research Visitor, AIST, Informatics Technology Research Institute, Tsukuba, Japan, July 2013 - July 2013
- Research Visitor, EPCC, University of Edinburgh, February 2011 - October 2011

Track Record of Research Funding

- Embed Digital Skills in Arts and Humanities Research (UKRI/AHRC), 2022, GBP 236,000 [Under Review]
- Towards Large-scale Cultural Analytics in the Arts and Humanities. UKRI/AHRC, GBP 100,000
- Research Fellowship in Digital Scholarship, National Library of Scotland, 2021, GBP 7,500
- COVID-19 Response & Recovery Small Grant Funding, Data-Driven Innovation grant, 2020, GBP 10,000
- Text and Data Mining, Data-Driven Innovation grant, 2019, GBP 133,000
- Two Postdoctoral and Early Career Researcher Exchanges grant, SICSA, 2015/17, GBP 7,500/13,580
- Observation Imaging and Interpretation, UoE grant, 2016-2017, GBP 3000
- Combining knowledge to pioneer big-data solutions for SKA, CSIC grant, 2016-2018, EUR 26,000
- Driving UK HPC enabled science and innovation through US collaborations to SC14, 2014, GBP 2,500
- Two HPC-Europa2 PRACE grants, 2011, GBP 6,000

Awards and Scholarships

- International HPC Summer school student travel award, Ljubljana, Slovenia, 2016
- Best poster award, SACSIS 2012, Kobe, Japan, 2012
- Scholarship for Doctoral Training Programme, University Carlos III Madrid, Spain, 2005, EUR 12,000
- Student travel award, TCPP PhD Forum at IPDPS Conference, Miami, 2008, USD 500

Teaching and Invited Lectures

- Course leader of *Principles of Computer Communication Systems*, University of St Andrews, 2022/23
- Course co-leader *Data Bases*, University of St Andrews, 2021/22 and 2022/23
- Teaching of Computer System Courses at University Carlos III of Madrid, from 2005 to 2010: *Operating Systems, Computer Architecture, Fault-tolerant Systems, Introduction to Programming, Computer Structure and Distributed Systems*.
- Invited 3-days lectures for the MSc in Artificial Intelligence at the University Polytechnic of Madrid, Spain, June 2022
- Two invited lectures for the MSc in Informatics at the University of Lleida, Spain 2013-2014
- Invited lectures for Innovative Learning Week and The Data Lab Welcome for MSc students at the University of Edinburgh, 2014 and 2016

Supervision Experience

- PhD Supervision:
 - Supervision of a PhD student at the University of St Andrews, starting at January 2023
 - Co-Supervision of PhD students (all successfully completed), at the University of Edinburgh, from 2015 to 2021
 - * Ole Weidner, *A Telemetry Framework for High-Performance Computing Environments*, June 2021
 - * Luca Trani, *Holistic Catalogues for Data-Intensive Science*, September 2019
 - * Alessandro Spinuso, *Active Provenance for Data Intensive Research*, June 2018
- MSc and BSc Supervision:
 - Supervision of three BSc students at the University of St Andrews, since 2022/23
 - Supervision of four MSc students at the University of St Andrews, since 2021/22
 - Supervision of two BSc students at the Heriot-Watt University, since 2021/22
 - Supervised four MSc students at the University of Edinburgh from 2018 to 2020
 - Supervised six MSc students at the University of Edinburgh from 2012 to 2016
 - Supervision of seven MSc students at the University Carlos III Madrid, 2006 to 2010
- Supervision of an intern within the *St Andrews Research Internship Scheme (StARIS)*, summer 2022.
- Co-Supervision of two PRACE students at the University of Edinburgh, from 2017 to 2020
- Supervision of six Open Science Data Cloud-PIRE students at the University of Edinburgh, from 2012 to 2015

Examination Experience

- External PhD examination, since 2012
 - Giannis Evagorou, *Methods for Efficient Storage, Distribution and Scalable Analysis of Spatial Data*, Imperial College London University, UK, 2021
 - Pablo Cerro, *Modelling and validation of cloud systems using model driven engineering, metamorphic and mutation testing*, Complutense University of Madrid, Spain, 2020
 - Hector Ortega, *Parallel Approaches to Shortest-Path Problems for Multilevel Heterogeneous Computing*, Univeristy of Valladolid, Spain, 2015
 - Idafen Santana Pérez, *Conservation of Computational Scientific Execution Environments for Workflow-based Experiments Using Ontologies*, Polytechnic University of Madrid, Spain, 2015
 - Jordi Villaplana, *Management of Cloud systems applied to eHealth*, University of Lleida, Spain, 2015
 - Miquel Orobítg, *High performance computing on biological sequence alignment*, University of Lleida, Spain, 2013
 - Laura Prada, *New techniques to model energy-aware I/O architectures based on SSD and hard disk drives*, University Carlos III Madrid, Spain, 2012

Hosting and Training Experience

- Co-hosted a SICSA distinguished Visiting Fellow at the University of St Andrews, 2022
- Hosted six HPC-Europa3 visitors at the University St Andrews, at the University of Edinburgh and the Heriot-Watt University, since 2019 to 2022
- Coordination and preparation of five *Apache Spark* training courses at the University of Edinburgh and BGS, from 2017 to 2020.
- Coordination and preparation of seven training courses at the University of Edinburgh, from 2014 to 2020: *Introduction to Machine Learning*, *Introduction to Data Science*, and *dispel4py*.

Community Service

- Group Leader of the Systems Research Group (SRG), at the University of St Andrews, since February 2022
- Reviewer for the H2020 *MAESTRO* project funded by the European Commission, February 2022
- Expert for the *Workflow Community Summit* track *Improving workflow systems' interface with legacy and emerging HPC software and hardware stack*, April 2021
- Participation in the *Workflow Community Summit* events, since January 2021
- Expert external evaluator for *EU H2020-ICT* proposals, 2019
- Lead author of the *Data-Driven Geoscience Platform* research line for the BGS, February 2017
- Participation in the *SC Mentor-Protege Program* as mentor, during SC16, Salt Lake City, November 2016
- Reviewer for the H2020 *EXCAPE* project, May 2016 to September 2018
- Participation in the *European eXtreme Data and Computing Initiative* (EXDCI) as an expert in the field of *Weather, Climatology and Solid Earth Sciences*, since May 2016

Memberships

- UK Young Academy, September 2022 [Under Review]
- The British Academy Early Career Researcher Network, since September 2022

Conferences, Workshops and Sessions Organizer

- Program Co-Chair for 19th IEEE International Conference on eScience, October 2023
- Co-Chair for the 15th, 16th and 17th editions of the Workshop on Workflows in Support of Large-Scale Science (WORKS) at Super Computing (SC) conferences, from 2020 to 2022
- Co-Chair of the Bridging from Concepts to Data and Computation (BC2DC) workshop co-located with IEEE eScience, 2019
- Co-Organiser of the session Data-Oriented and Self-Optimizing Architectures and Workflows for Earth, Space and Climate Science Applications, AGU, 2019
- Co-Organiser of the session Data-Driven Platforms and VREs for Complex Earth, Space, and Environmental Science Applications, AGU, 2018

Programme Committee Memberships

- Programme Committee member, Euro-Par'2023, August 2023.
- Programme Committee member, 29th IEEE International Conference on High Performance Computing, Data, and Analytic (HiPC), 2022
- Programme Committee member for SC22, 2021 and 2022
- Programme Committee member for IEEE Cluster, 2021
- Programme Committee member for the International Workshop on Science Gateways, from 2018 to 2022
- Programme Committee member for the IEEE IPDPS, 2020 and 2021
- Programme Committee member for the IEEE eScience conference, 2019
- Programme Committee member for the CCGrid Conference, 2016 and 2021
- Programme Committee member for the TPDL 2016 on Reproducible Open Science Workshop, 2016
- Programme Committee member for the ACM Conference on Service-Oriented Architectures and Programming, 2015
- Programme Committee member for the IEEE Conference on International Symposium on Parallel and Distributed Processing with Applications, 2012 and 2013
- Programme Committee member for the IEEE Symposium on Computers and Communications Conference, 2010

Journal Reviewing

- Reviewer for the Future Generation Computer Systems, 2019 and 2020
- Reviewer for the Journal of Frontiers of Information Technology & Electronic Engineering, 2017
- Reviewer for the Journal of Systems and Software, 2013
- Reviewer for the Journal of Simulation Modelling Practice and Theory, 2013

Selected Invited Speaker

1. *frances: An AI-toolbox to discover automatically insights from Data Foundry collections*, British Library, 2022
2. *Apache Spark Seminar: A Hands-On Introduction to Apache Spark and to its Programming Model*, University Polytechnic of Madrid (UPM), 2022
3. *NLS Digital Scholarship Seminars*, National Library of Scotland (NLS), 2022
4. *Advanced data-driven frameworks to develop reproducible data science applications at scale*, Workshop on Re-envisioning Extreme-Scale I/O for Emerging Hybrid HPC Workloads, 2021
5. *Improving workflow systems' interface with legacy and emerging HPC software and hardware stack*, Workflows Community Summit, online, 2021
6. *Analysing Digital Historical Textual Data at Scale with Defoe Toolbox*, RLUK, Text and Data Mining Seminar, 2020
7. *defoe: A Spark-based Toolbox for Analysing Digital Historical Textual Data*. USC, Los Angeles, US, 2019

8. *Empowering domain experts with DARE, a new cloud-based platform and working environment.* RSEConUK, Birmingham, UK, 2019
9. *Delivering easy-to-use frameworks to empower data-driven research.* UK-France Bilateral International Meeting, Royal Society, Chicheley, UK, 2019
10. *Delivering easy-to-use frameworks to empower data-driven applications on HPC environments,* HPCKM'17, San Sebastian, Spain, 2017.
11. *ENVRiplus: Review of existing Research Infrastructures: Requirements, Technologies, Achievements and Gaps leading to Characterization.* USC, Los Angeles, US, 2016
12. *Data Science in Action.* Organised by The Data Lab, Edinburgh, UK, 2015
13. *Earthquake and Failure Forecasting in Real-Time: A Forecasting Model Testing Center.* Organised by INSPIRES Center at University of Lleida, Lleida, Spain, 2013

Selected Publications

• Journal Articles

1. Suzanne R. Black, **Rosa Filgueira**, Lesley McAra, *et al.* *Evaluating Events Data for Cultural Analytics: A case study on the economic and social effects of Covid-19 on the Edinburgh Festivals.* Creative Industries Journal, 2022 [Under Review].
2. Suzanne R. Black, **Rosa Filgueira**, Lesley McAra, *et al.* *Cultural Analytics in the UK: Current Work and Future Potential.* Cultural Trends, 2022 [Under Review].
3. Pablo C. Cañizares , Alberto Núñez, **Rosa Filgueira**, *et al.* *Parallel Mutation Testing for Large Scale Systems .* Future Generation Computer Systems (FGCS), 2022 [Under Review]
4. Liang Liang, **Rosa Filgueira**, *et al.* *Scalable Adaptive Optimizations for Stream-based Workflows in Multi-HPC-Clusters and Cloud Infrastructures.* Future Generation Computer Systems (FGCS), vol. 128, pp. 102-116, 2022
5. Johanna M. Scheidegger, ..., **Rosa Filgueira**. *Integration of 2D Lateral Groundwater Flow into the Variable Infiltration Capacity (VIC) Model and Effects on Simulated Fluxes for Different Grid Resolutions and Aquifer Diffusivities.* Water, vol. 13, March 2021
6. Sandra Engwell, ... , **Rosa Filgueira**. *Near-real-time volcanic cloud monitoring: insights into global explosive volcanic eruptive activity through analysis of Volcanic Ash Advisories.* Bulletin of Volcanology, vol. 83, pp. 1-17, January 2021
7. Iraklis A. Klampanos, Chrysoula Themeli, **Rosa Filgueira**, *et al.* *DARE Platform: a Developer-Friendly and Self-Optimising Workflows-as-a-Service Framework for eScience on the Cloud.* The Journal of Open Software, vol. 5, October 2020
8. Paolo Marangio, Vyron Christodoulou, **Rosa Filgueira**, *et al.* *Highlights Automatic detection of Ionospheric Alfvén Resonances in magnetic spectrograms using U-net.* Computers & Geoscience, vol. 145, 2020
9. Rafael Ferreira da Silva, **Rosa Filgueira**, *et al.* *Exploring PID Controllers for Online Resilient Resource Management of Distributed Scientific Workflows.* Future Generation Computer Systems, vol. 95, pp. 615-628, 2019
10. Luca Trani, **Rosa Filgueira**, Rosa Filgueira *et al.* *Establishing Core Concepts for Information-Powered Collaborations.* Future Generation Computer Systems, vol. 89, pp. 421-437, 2018
11. Luca Trani, **Rosa Filgueira**, *et al.* *WFCatalog: a catalogue for seismological waveform data.* Computers and Geosciences, vol. 106, pp. 101-108, 2017
12. Rafael Ferreira da Silva, **Rosa Filgueira**, *et al.* *A characterization of workflow management systems for extreme-scale applications.* Future Generation Computer Systems, vol. 75, pp. 228-238, 2017

13. **Rosa Filgueira**, Amrey Krause, *et al.* *dispe14py: A Python Framework for Data-Intensive Scientific Computing*. Special issue on Data-Intensive High Performance Computing. International Journal of High Performance Computing Applications, vol. 31, no. 4, pp. 316-334, 2016
14. Jordi Vilaplana, **Rosa Filgueira**, *et al.* *The Cloud Paradigm applied to e-Health*. BMC Medical Informatics and Decision Making, vol. 35, no. 13, pp.1-10, 2013
15. Alberto Nuñez, **Rosa Filgueira**, *et al.* *SIMCAN: A Flexible, Scalable and Expandable Simulation Platform for Modeling and Simulating HPC Architectures and Applications*. Simulation Modelling Practice and Theory, vol. 20, no. 1, pp. 12-32, 2012
16. **Rosa Filgueira**, David E. Singh, *et al.* *Adaptive CoMPI: Enhancing MPI-based Applications Performance and Scalability by Using Adaptive Compression*, The International Journal of High Performance Computing Applications, vol. 25, no. 1, pp. 93-114, 2012
17. **Rosa Filgueira**, Jesús Carretero, *et al.* *Dynamic-CoMPI: Dynamic Optimization Techniques for MPI Parallel Applications*. The Journal of Super Computing, vol. 59, no. 1, pp. 361-391, 2012

• **Refereed Conference and Workshop Papers**

1. Emily K. Adams, ..., **Rosa Filgueira**, *et al.* *Novel proposals for FAIR, automated, recommendable, and robust workflows*. 17th Workshop on Workflows in Support of Large Scale (WORKS'22), during SC22, Dallas, US, 14 November 2022.
2. **Rosa Filgueira**. *frances: a Deep Learning NLP and Text Mining Web-Tool to Unlock Historical Digital Collections*. IEEE 18th International Conference on eScience, Salt Lake City, US, October 2022.
3. **Rosa Filgueira**, Feras M. Awaysheh, *et al.* *SparkFlow: Towards high-performance data analytics for spark-based genome analysis*. 22nd IEEE International Symposium on Cluster, Cloud and Internet (CCGrid), Taormina, Sicily, Italy, May 2022.
4. Pablo C. Cañizares, ..., **Rosa Filgueira**, *et al.* *Validating communication network configurations in cloud and HPC systems using Metamorphic Testing*. 2022 4th International Electronics Communication Conference, June 2022.
5. **Rosa Filgueira**, Daniel Garijo. *Inspect4py: A Knowledge Extraction Framework for Python CodeRepositories*. The 2022 Mining Software Repositories Conference, Online, May 2022.
6. Henry Casanova, **Rosa Filgueira**, *et al.* *Emerging Frameworks for Advancing Scientific Workflows Research, Development, and Education*. 16th Workshop on Workflows in Support of Large Scale (WORKS'21), during SC21, Online, November 2021.
7. Rafael Ferreira da Silva, ..., **Rosa Filgueira**, *et al.* *A community roadmap for scientific workflows research and development*. 16th Workshop on Workflows in Support of Large Scale (WORKS'21), during SC21, Online, November 2021.
8. **Rosa Filgueira**, Claire Grover, *et al.* *Extending defoe for the Efficient Analysis of Historical Texts at Scale*. IEEE eScience, Online, September 2021.
9. Liang Liang, **Rosa Filgueira**, *et al.* *Adaptive Optimizations for Stream-based workflows*. 15th Workshop on Workflows in Support of Large Scale (WORKS'20), during SC20, Online, November 2020.
10. **Rosa Filgueira**, Beatrice Alex, *et al.* *Geoparsing the historical Gazetteers of Scotland: accurately computing location in mass digitised texts*. 8th Workshop on the Challenges in the Management of Large Corpora, Online, June 2020.
11. **Rosa Filgueira**, Michael Jackson, *et al.* *defoe: A Spark-based Toolbox for Analysing Digital Historical Textual Data*. IEEE eScience, Online, September 2019.
12. Malcolm Atkinson, **Rosa Filgueira**, *et al.* *Comprehensible Control for Researchers and Developers facing Data Challenges*. IEEE eScience, San Diego, US, September 2019.

13. **Rosa Filgueira**. *DARE Platform: Enabling Easy Data-Intensive Workflow Composition and Deployment*. Research Objects Workshop (RO2019), during IEEE eScience, San Diego, US September 2019.
14. Vyron Christodoulou, **Rosa Filgueira**, *et al.* *Automatic classification of Aurora-related tweets using machine learning methods*, 2nd International Conference on Geoinformatics and Data Analysis (ICGDA), Prague, Czechia, March 2019
15. **Rosa Filgueira**, Rafael Ferreira da Silva, *et al.* *IoT-Hub : New IoT Data-Platform for Virtual Research Environments*. 10th International Workshop on Science Gateways (IWSG 2018), Edinburgh, UK, June 2018
16. Rafael Ferreira da Silva, **Rosa Filgueira**, *et al.* *Using Simple PID Controllers to Prevent and Mitigate Faults in Scientific Workflows*. WORKS'16 Workshop, during SC16, Salt Lake City, US, November 2016
17. **Rosa Filgueira**, Rafael Ferreira da Silva, *et al.* *Asterism: Pegasus and dispe14py Hybrid Workflows for Data-intensive Science*. DataCloud'16 Workshop, during SC16, Salt Lake City, US, November 2016
18. Ole Weidner, **Rosa Filgueira**, *et al.* *Rethinking High Performance Computing Platforms: Challenges, Opportunities and Recommendations*. DIDC16 Workshop, Kyoto, Japan, June 2016
19. Rafael Ferreira da Silva, **Rosa Filgueira**, *et al.* *. Automating Environmental Computing Applications with Scientific Workflows*. ECW Workshop, 12th IEEE eScience , Baltimore, US, October 2016
20. **Rosa Filgueira**, Amrey Krause, *et al.* *dispe14py: A User-friendly Framework for Describing eScience Applications*. 11th IEEE eScience, Munich, Germany, 1-4 September 2015
21. Malcolm Atkinson, **Rosa Filgueira**, *et al.* *VERCE Delivers a Productive e-Science Environment for Seismology Research*. 11th IEEE eScience, Munich, Germany, September 2015
22. **Rosa Filgueira**, Malcolm Atkinson, *et al.* *VarPy: A Python Library for Volcanology and Rock Physics Data Analysis*. PyHPC'14 Worksop, during SC14, New Orleans, US, November 2014
23. Sandra Gesing, **Rosa Filgueira**, *et al.* *Workflows in a Dashboard: A New Generation of Usability*. 14th Workshop on Workflows in Support of Large Scale (WORKS), during SC14, New Orleans, US, November 2014
24. **Rosa Filgueira**, Malcolm Atkinson, *et al.* *e-Science Gateway Stimulating Collaboration in Rock Physics and Volcanology*. 10th IEEE eScience, Guarujá, Brazil, October 2014
25. **Rosa Filgueira**, Malcolm P. Atkinson, *et al.* *Applying Selectively Parallel I/O Compression to Parallel Storage Systems*. European Conference on Parallel and Distributed Computing (Euro-Par), Porto, Portugal, August 2014
26. **Rosa Filgueira**, Iraklis Klampanos, *et al.* *FAST: Flexible Automated Synchronization transfer*. In proceedings of High-Performance Parallel and Distributed Computing. ACM International Workshop on Data Intensive Distributed Computing (DICT), Vancouver, Canada, June 2014
27. Yusuke Tanimura, **Rosa Filgueira**, *et al.* *Two-Phase Collective I/O based on Advanced Reservations to Obtain Performance Guarantees from Shared Storage Systems*. Workshop on Interfaces and Architectures for Scientific Data Storage (IASDS), Indianapolis, IN, US, September 2013
28. Yusuke Tanimura, **Rosa Filgueira**, *et al.* *MPI Collective I/O based on Advanced Reservations to Obtain Performance Guarantees from Shared Storage Systems*. IEEE International Conference on Cluster Computing (CLUSTER), Indianapolis, IN, US, September 2013
29. Alberto Nunez, **Rosa Filgueira**, *et al.* *SANComSim: A Scalable, Adaptive and Non-intrusive Framework to Optimize Performance in Computational Science Applications*. International Conference on Computational Science (ICCS), Barcelona, Spain, June 2013
30. **Rosa Filgueira**, Malcolm Atkinson, *et al.* *An Adaptive, Scalable, and Portable Technique for Speeding Up MPI-Based Applications*. International European Conference on Parallel and Distributed Computing (Euro-Par), Rhodes Island, Greece, August 2012

31. Gabriel G. Castañe, **Rosa Filgueira**, *et al.* *Dimensioning Scientific Computing Systems to Improve Performance of Map-Reduce based Applications*. International Conference on Computational Science (ICCS), pp.: 226-235, Omaha, Nebraska, June 2012
32. **Rosa Filgueira**, David E. Singh, *et al.* *CoMPI: Enhancing MPI Based Applications Performance and Scalability Using Run-Time Compression*. EURO PVM/MPI, Espoo, Finland, September 2009
33. **Rosa Filgueira**, David E. Singh, *et al.* *Exploiting Data Compression in Collective I/O Techniques*. IEEE International Conference on Cluster Computing (CLUSTER), Tsukuba, Japan, October 2008
34. **Rosa Filgueira**, David E. Singh, *et al.* *Data Locality Aware Strategy for Two-Phase Collective I/O*. In Proceedings of High Performance Computing for Computational Science (VECPAR), Toulouse, France, June 2008
35. **Rosa Filgueira**, David E. Singh, *et al.* *Optimization and Evaluation of Parallel I/O in BIPS3D Parallel Irregular Application*. 21st IEEE International Parallel and Distributed Processing Symposium (IPDPS), Long Beach, California US, March 2007

- **Books and Book chapters**

1. **Rosa Filgueira**, Malcolm Atkinson, *et al.* Chapter: *dispe14py: Agility and Scalability for Data-Intensive HPC*. Springer eBook on Conquering Big Data Using High Performance Computing, 2016
2. **Rosa Filgueira**, David E. Singh, *et al.* Book: *Optimization Techniques for Parallel Applications on Clusters*. Lambert Academic Publishing, 978-3-8433-70, 2010