

Moustafa ABDELBAKY

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EDUCATION

- MAY 2017 Ph.D., ELECTRICAL & COMPUTER ENGINEERING, **Rutgers University**, New Brunswick, NJ
Dissertation: "Programming and Managing Distributed Software-Defined Environments"
Advisor: Prof. Manish PARASHAR
- MAY 2012 M.S., ELECTRICAL & COMPUTER ENGINEERING, **Rutgers University**, New Brunswick, NJ
Thesis: "A Framework for Enabling High-end High Performance Computing Resources as a Service"
Advisor: Prof. Manish PARASHAR
- MAY 2008 B.Sc., ELECTRICAL & COMPUTER ENGINEERING, **Rutgers University**, New Brunswick, NJ
- MAY 2008 B.Sc., COMPUTER SCIENCE, **Rutgers University**, New Brunswick, NJ

RESEARCH INTERESTS

Distributed computing, software-defined environments, and machine learning to support large-scale, realtime, secure, and data-driven applications in Science, Big Data, and the Internet of Things (IoT).

PROFESSIONAL EXPERIENCE

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| AUG 2017
PRESENT | Postdoctoral Scholar with Prof. David CULLER at
THE UNIVERSITY OF CALIFORNIA, BERKELEY
THE DEPARTMENT OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE
<i>Berkeley, CA</i> <ul style="list-style-type: none">Research on using machine learning for modeling, prediction, and control of smart buildings in the context of the Internet of Things.Research on using a Blockchain-based decentralized authentication to enable secure CDNs. |
| SEP 2009-JUL 2017 | Graduate Research Assistant with Prof. Manish PARASHAR at
RUTGERS UNIVERSITY
RUTGERS DISCOVERY INFORMATICS INSTITUTE (RDI ²)
THE NSF CLOUD AND AUTONOMIC COMPUTING CENTER (NSFCAC)
THE APPLIED SOFTWARE SYSTEMS LABORATORY (TASSL)
<i>Piscataway, NJ</i> <ul style="list-style-type: none">Research on autonomic computing, software-defined environments, and federated computing for science and engineering applications.Investigated the use of cloud computing abstractions to enable high performance computing as a service. The resulting framework (iCode) received an international award and was featured in multiple media outlets [PC2].Performed research on distributed interactive steering and collaborative visualization environment. |

SUMMER 2015	<p>Research Intern at IBM T. J. WATSON RESEARCH CENTER <i>Yorktown Heights, NY</i></p> <ul style="list-style-type: none"> Developed a novel method for deploying Docker containers across multiple clouds and data centers. The resulting framework (C-Ports) received an international award and was featured in multiple media outlets [PC1].
SUMMERS 2010, 2011, 2012, 2014	<p>Research Intern at IBM T. J. WATSON RESEARCH CENTER <i>Cambridge, MA</i></p> <ul style="list-style-type: none"> Research on providing scientific software as a service. Research on building elastic data assimilation as a service. Research on providing IBM Blue Gene supercomputers as a service. Research on High Performance Cloud Computing.
JAN-OCT 2009	<p>Software Developer at PRINCETON PLASMA PHYSICS LABORATORY (PPPL) PRINCETON UNIVERSITY <i>Princeton, NJ</i></p> <ul style="list-style-type: none"> Contributed to the development of ELVis, a Scientific Graphics software for Visualization and Monitoring.
SEP 2008-AUG 2009	<p>Research Assistant with Prof. Manish PARASHAR at RUTGERS UNIVERSITY THE APPLIED SOFTWARE SYSTEMS LABORATORY (TASSL) <i>Piscataway, NJ</i></p> <ul style="list-style-type: none"> Developed a portal for online risk analytics using CometCloud.
JAN 2008-AUG 2009	<p>Undergraduate Research Assistant with Prof. Grigore BURDEA at RUTGERS UNIVERSITY CENTER FOR ADVANCED INFORMATION PROCESSING THE HUMAN-MACHINE INTERFACE LABORATORY <i>Piscataway, NJ</i></p> <ul style="list-style-type: none"> Research on using the PlayStation 3 and cell phones for mental and physical patient rehabilitation in collaboration with Indiana University School of medicine.
AUG 2007-JAN 2008	<p>Undergraduate Research Assistant with Prof. Michael L. BUSHNELL at RUTGERS UNIVERSITY CENTER FOR ADVANCED INFORMATION PROCESSING <i>Piscataway, NJ</i></p> <ul style="list-style-type: none"> Research on Nano-Technology (Single Electron Transistors).
SUMMER 2007	<p>Systems Engineer Intern at JOHN WILEY & SONS INC. <i>Somerset, NJ</i></p> <ul style="list-style-type: none"> Installed and maintained VMware servers, IBM blade and standalone servers.

AWARDS AND HONORS

June 2017	Ph.D. Forum Award, the 31 st IEEE International Parallel & Distributed Processing Symposium (IPDPS 2017), Orlando, FL, USA
May 2017	Graduate Program Academic Achievement Award, Department of Electrical & Computer Engineering, Rutgers University
December 2015	Winner of the Cloud Challenge Award (Category 2), the 8 th IEEE/ACM International Conference on Utility and Cloud Computing (UCC 2015), St. Raphael Resort, Limassol, Cyprus
2013-2014	IBM Ph.D. Scholarship Award
2012-2013	IBM Ph.D. Fellowship Award
2011-2012	IBM Ph.D. Fellowship Award
May 2011	Winner of the 4 th IEEE International Scalable Computing Challenge (SCALE), 11 th IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing (CCGrid 2011), Newport Beach, CA, USA
2009	IEEE ETA KAPPA NU Electrical & Computer Engineering Honor Society

Conference Travel Awards

June 2017	Student Travel Award, the 26 th ACM International Symposium on High-Performance Parallel and Distributed Computing (HPDC17), Washington D.C., USA
June 2017	Student Travel Award, the 31 st IEEE International Parallel & Distributed Processing Symposium (IPDPS 2017), Orlando, FL, USA
May 2017	Student Travel Award, the 17 th IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing (CCGrid 2017), Madrid, Spain
November 2015	Student Travel Award, the 28 th International Conference for High Performance Computing, Networking, Storage and Analysis (SC15), Austin, TX, USA
November 2012	Student Travel Award, the 25 th International Conference for High Performance Computing, Networking, Storage and Analysis (SC12), Salt Lake City, UT, USA
November 2011	Student Travel Award, the 24 th International Conference for High Performance Computing, Networking, Storage and Analysis (SC11), Seattle, WA, USA

Other Awards	Spring 2008	Rutgers Computing Facilities - Consultant of the Semester
	April 2007	Rutgers Computing Facilities - Consultant of the Month

PRESS COVERAGE

- PC.1 C-Ports: a prototype framework developed with IBM T.J. Watson Research Center won the [UCC Challenge award](#) and was featured in [Fortune magazine](#), [IBM Developer Works](#), [Docker Weekly Blog](#), [First Post](#), [Reefeed](#), [Cloud FAQs](#), [Container House](#), [New Relic](#), [Drag Plus](#), [Docker Scoop](#), and [Mycamms](#).
- PC.2 [CometCloud/iCode](#): a prototype framework developed with IBM T.J. Watson Research Center and UT-Austin won the [SCALE Challenge](#) and was featured in [ACM TechNews](#), [Communications of the ACM](#), [HPC Wire](#), [insideHPC](#), [Futurity](#), [RutgersToday](#), [Media Newswire](#), [ComputerWorld-Australia](#), [ComputerWorld-New Zealand](#), [Network World](#), (Also in [Spanish](#) and [Polish](#)), [IT World](#), [MacWorld](#), [CIO](#), [CIO Peru](#), [BetaNews](#) (English Translation [here](#)), [InfoWorld](#), [idealogy \(NZ\)](#), [Primeur Magazine](#), [OSP](#) (English Translation [here](#)), [GenomeWeb](#), and [PC World](#) (Middle East).
- PC.3 A project for using virtual reality for tele-rehabilitation was featured in [Science Daily](#) ([here](#), and [here](#)), [Rutgers News](#), [Red Orbit](#), [Loop](#), [Medical Mal Blog](#), [EurekaAlert](#), and [Media dis&dat](#).

PATENTS

- P.1 Burdea, G., AbdelBaky, M., and Rabin, B., 2014. Periodic evaluation and telerehabilitation systems and methods. U.S. Patent 8,758,020.
- P.2 "Idle Datacenter Resource Donation," Provisional Patent Filed, Full Patent Pending.

PUBLICATIONS

Journals

- J.1 AbdelBaky, M., Diaz-Montes, J. and Parashar, M., 2017. Software-Defined Environments for Science & Engineering. The International Journal of High Performance Computing Applications, 1094342017710706.
- J.2 Diaz-Montes, J., AbdelBaky, M., Zou, M. and Parashar, M., 2015. CometCloud: Enabling Software-Defined Federations for End-to-End Application Workflows. IEEE Internet Computing, 19(1), pp.69-73. IEEE.
- J.3 Parashar, M., AbdelBaky, M., Rodero, I. and Devarakonda, A., 2013. Cloud Paradigms and Practices for Computational and Data-enabled Science and Engineering. IEEE Computing in Science & Engineering (CiSE), 15(4), pp.10-18. IEEE.
- J.4 AbdelBaky, M., Parashar, M., Kim, H., Jordan, K.E., Sachdeva, V., Sexton, J., Jamjoom, H., Shae, Z.Y., Pencheva, G., Tavakoli, R. and Wheeler, M.F., 2012. Enabling High-performance Computing as a Service. IEEE Computer, 45(10), pp.72-80. IEEE. **Published as the featured research in October 2012.**
- J.5 Huber, M., Rabin, B., Docan, C., Burdea, G.C., AbdelBaky, M. and Golomb, M.R., 2010. Feasibility of Modified Remotely Monitored In-home Gaming Technology for Improving Hand Function in Adolescents With Cerebral Palsy. IEEE Transactions on Information Technology in Biomedicine, 14(2), pp.526-534.
- J.6 Golomb, M.R., McDonald, B.C., Warden, S.J., Yonkman, J., Saykin, A.J., Shirley, B., Huber, M., Rabin, B., AbdelBaky, M., Nwosu, M.E. and Barkat-Masih, M., 2010. In-home Virtual Reality Videogame Telerehabilitation in Adolescents With Hemiplegic Cerebral Palsy. Archives of physical medicine and rehabilitation, 91(1), pp.1-8. **Published as the leading paper in January 2010 and featured as the hottest article in March 2010.**

Conference Proceedings & Workshops

- C.1 Zamani, A.R., AbdelBaky, M., Balouek-Thomert, D., Villalobos, J.J., Rodero, I. and Parashar, M., 2017, November. Submarine: A Subscription-based Data Streaming Framework for Integrating Large Facilities and Advanced Cyberinfrastructure. The 8th International Workshop on Data-Intensive Computing in the Clouds, in conjunction with the 30th International Conference for High Performance Computing, Networking, Storage and Analysis (SC17), Denver, CO, USA. ACM.
- C.2 AbdelBaky, M., Zou, M., Zamani, A.R., Renart, E., Diaz-Montes, J., and Parashar, M., 2017. Computing in the Continuum: Combining Pervasive Devices and Services to Support Data-driven Applications. To appear in the 37th IEEE International Conference on Distributed Computing Systems (ICDCS 2017), Atlanta, GA, USA. IEEE.
- C.3 AbdelBaky, M., Diaz-Montes, J. and Parashar, M., 2017. Towards Distributed Software-Defined Environments. In Proceedings of the 2017 IEEE/ACM 17th International Symposium on Cluster, Cloud and Grid Computing (CCGrid), Madrid, Spain, (pp. 703-706). IEEE.
- C.4 AbdelBaky, M., Diaz-Montes, J., Unuvar, M., Romanus, M., Steinder, M., Rodero, I. and Parashar, M., 2017. Enabling Distributed Software-Defined Environments Using Dynamic Infrastructure Service

Composition. In Proceedings of the 2017 IEEE/ACM 17th International Symposium on Cluster, Cloud and Grid Computing (CCGrid), Madrid, Spain, (pp. 274-283). IEEE.

- C.5 Wang, J., AbdelBaky, M., Diaz-Montes, J., Purawat, S., Parashar, M. and Altintas, I., 2016, June. Kepler+ CometCloud: Dynamic Scientific Workflow Execution on Federated Cloud Resources. In Proceedings of the 2016 3rd Workshop on Advances in the Kepler Scientific Workflow System and Its Applications. In conjunction with the International Conference on Computational Science (ICCS), San Diego, CA, USA, 80, (pp.700-711). Procedia Computer Science.
- C.6 AbdelBaky, M., Unuvar, M., Diaz-Montes, J., Parashar, M. and Steinder, M., 2015, December. Docker Containers Across Multiple Clouds and Data Centers. In Proceedings of the 2015 IEEE/ACM 8th International Conference on Utility and Cloud Computing (UCC), St. Raphael Resort, Limassol, Cyprus, (pp. 368-371). IEEE. **Winner of the 2015 Cloud Challenge Award – Category 2.**
- C.7 AbdelBaky, M., Diaz-Montes, J., Zou, M. and Parashar, M., 2015, June. A Framework for Realizing Software-Defined Federations for Scientific Workflows. In Proceedings of the 2nd International Workshop on Software-Defined Ecosystems co-located with the 24th ACM International Symposium on High-Performance Distributed Computing (HPDC), Portland, OR, USA, (pp. 7-14). ACM.
- C.8 Qi, X., Xing, F., Ghadge, M., Rodero, I., AbdelBaky, M., Parashar, M., Sadimin, E., Foran, D.J. and Yang, L., 2012, October. Content-based Image Retrieval on Imaged Peripheral Blood Smear Specimens using High Performance Computation. In Proceedings of Data- & Compute-Intensive Clinical & Translational Imaging Applications workshop. In conjunction with the 15th International Conference on Medial Image Computing and Computer Assisted Intervention (DICTA-MICCAI), Nice, France, (pp. 51-60).
- C.9 AbdelBaky, M., Kim, H., Rodero, I. and Parashar, M., 2012, June. Accelerating MapReduce Analytics Using CometCloud. In Proceedings of the 2012 IEEE 5th International Conference on Cloud Computing (IEEE CLOUD)– Applications & Experience Track, Honolulu, HI, USA, (pp. 447-454). IEEE.
- C.10 Kim, H., AbdelBaky, M. and Parashar, M., 2009, October. CometPortal: A Portal for Online Risk Analytics Using CometCloud. In Proceedings of the 18th International Conference on Computing Theory and Applications (ICCTA), Alexandria, Egypt.
- C.11 Golomb, M.R., Barkat-Masih, M., Rabin, B., AbdelBaky, M., Huber, M. and Burdea, G., 2009, June. Eleven Months of Home Virtual Reality Telerehabilitation-Lessons Learned. In Proceedings of 2009 Virtual Rehabilitation International Conference, Haifa, Israel, (pp. 23-28). IEEE.
- C.12 Huber, M., Rabin, B., Docan, C., Burdea, G., Nwosu, M.E., AbdelBaky, M. and Golomb, M.R., 2008, August. PlayStation 3-based Tele-rehabilitation for Children With Hemiplegia. In 2008 Virtual Rehabilitation International Conference, Vancouver, Canada, (pp. 105-112). IEEE.

Invited Papers & Research Reports

- I.1 Zamani, A.R., AbdelBaky, M., Balouek-Thomert, D., Rodero, I. and Parashar, M., 2017, October. Supporting Data-driven Workflows Enabled by Large Scale Observatories. The First International Workshop on Workflow Science (WoWS 2017), co-located with the 13th IEEE International Conference on eScience (eScience 2017), Auckland, New Zealand. IEEE.
- I.2 Parashar, M., AbdelBaky, M., Zou, M., Zamani, A.R. and Diaz-Montes, J., 2015, June. Realizing the Potential of IoT Using Software-Defined Ecosystems. In Proceedings of the 2015 IEEE 8th International Conference on Cloud Computing (IEEE CLOUD), New York, NY, USA, (pp. 1149-1158). IEEE.
- I.3 AbdelBaky, M., Diaz-Montes, J., Johnston, M., Sachdeva, V., Anderson, R.L., Jordan, K.E. and Parashar, M., 2014, October. Exploring HPC-based Scientific Software as a Service Using CometCloud. In Proceedings

of the 2014 International Conference on Collaborative Computing: Networking, Applications and Worksharing (CollaborateCom), Miami, FL, USA, (pp. 35-44). IEEE.

- I.4 Diaz-Montes, J., AbdelBaky, M., Zou, M. and Parashar, M., 2014, June. Software-Defined Federated Cyber-infrastructure for Science and Engineering. In Proceedings of the 2014 ACM international workshop on Software-Defined Ecosystems co-located with the 23rd ACM International Symposium on High-Performance Distributed Computing (HPDC), Vancouver, Canada, (pp. 9-12). ACM.
- I.5 AbdelBaky, M., 2012. Enabling High-End High Performance Computing Resources as a Service: A Framework Implementation. LAP Lambert Academic Publishing.
- I.6 Parashar, M., AbdelBaky, M., Rodero, I. and Devarakonda, A., 2012. Cloud Paradigms and Practices for CDS&E. Rep. Print. Cloud and Autonomic Computing Center Research Report.

PRESENTATIONS

Invited Talks

- PIT.1 AbdelBaky, M., 2018, May. Using Reinforcement Learning in Smart Buildings. A part of the CS Seminar, Lawrence Berkeley National Laboratory, Berkeley, CA, USA.
- PIT.2 AbdelBaky, M. and Panagopoulos, A.A., 2018, January. Using Reinforcement Learning in Smart Buildings. The RISE Winter Retreat, Monterey, CA, USA.
- PIT.3 AbdelBaky, M. 2017, December. Programming and Managing Distributed Software-Defined Environments. A part of the BETS Group Seminars, University of California, Berkeley, CA, USA.
- PIT.4 AbdelBaky, M., Panagopoulos, A.A., and Fierro G, 2017, October. Exploring Machine Learning Opportunities in the Context of IoT. A part of the RISE Lab Seminars, University of California, Berkeley, CA, USA.
- PIT.5 Parashar, M. and AbdelBaky, M., 2014, August. Exploring Computational Frameworks For Future Computational Chemistry. A part of the "The Future of Computational Chemistry," Division of Physical Chemistry, 248th ACS National Meeting, San Francisco, CA, USA.
- PIT.6 AbdelBaky, M., 2014, May. Running Value at Risk Analysis Using High Performance Computing as a Service. A part of the brown bag seminars at the Department of Management Science and Information Systems, Rutgers, The State University of New Jersey, Piscataway, NJ, USA.
- PIT.7 AbdelBaky, M. and Parashar, M., 2013, July. Building Platform as a Service for Scientific Applications. The Code and Data Interoperability Workshop, NSF Sustainable Software for Chemistry and Materials, Virginia Tech, Blacksburg, VA, USA.
- PIT.8 AbdelBaky, M., Parashar, M., and Jordan, K.E., 2013, March. Cloud Computing Practices for Scientific Computing Applications. A part of "the Computational Science in the Exascale Era - Challenges and Opportunities" Mini Symposium at the 2013 SIAM Conference on Computational Science and Engineering, Boston, MA, USA
- PIT.9 AbdelBaky, M., Watzl, J., and Parashar, M., 2012, April. Cloudy With A Chance Of Charity. A part of the "Entrepreneurship Helping Developing Economies" panel, Rutgers Entrepreneurship Day, New Brunswick, NJ, USA.
- PIT.10 AbdelBaky, M., 2010, November. Supercomputing: There's an App for that!. An invited talk at KAUST University Booth, International Conference for High Performance Computing, Networking, Storage and Analysis (SC10), New Orleans, LA, USA.

Posters & Demonstrations

- PD.1 Fierro, G., Feinberg, V., Lengyel, D., Panagopoulos, A.A., Abdelbaky, M., Pritoni, M., Peffer, T., Gonzalez, J., Stoica, I., Katz, R., and Culler, D.E., 2018, January. If Reinforcement Learning is the Answer is Smart Building Control the Question? The RISE Winter Retreat, Monterey, CA, USA.
- PD.2 Devarakonda, A., AbdelBaky, M., Claus, B.L, Rodero, I., Haldeman, M., Parashar, M., 2012, May. Accelerating Asynchronous Replica Exchange on Large-Scale Distributed Heterogeneous HPC Resources. The 5th IEEE International Scalable Computing Challenge (SCALE), in conjunction with the 12th IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing, Ottawa, Canada. **(Finalist)**.
- PD.3 Kim, H., AbdelBaky, M., and Parashar, M., 2011, September. Enabling Science and Engineering Workflows on Dynamically Federated Cloud Infrastructure using CometCloud. In China-US Software Workshop, KIAA Institute, Peking University, Beijing, China.
- PD.4 AbdelBaky, M., Parashar, M., Kim, H., Jordan, K.E., Sachdeva, V., Sexton, J., Jamjoom, H., Shae, Z.Y., Pencheva, G., Tavakoli, R. and Wheeler, M.F., 2011, May. A Scalable Ensemble-based Oil-Reservoir Simulations using Blue Gene/P-as-a-Service. The 4th IEEE International Scalable Computing Challenge (SCALE), in conjunction with the 11th IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing at Newport Beach CA, USA. **(1st Place)**.
- PD.5 AbdelBaky, M., Jordan, K.E., Parashar, M., and Sachdeva, V., 2010, November. Cloudy with a Chance of Supercomputing: A Framework for Enabling Supercomputing Resources as HPC Clouds. In Early Adopters PhD Workshop 2010, International Conference for High Performance Computing, Networking, Storage and Analysis (SC10), New Orleans, LA, USA.
- PD.6 AbdelBaky, M., Parashar, M. and Jordan, K.E., 2010, November. CO2 Sequestration on HPC Clouds. International Conference for High Performance Computing, Networking, Storage and Analysis (SC10), New Orleans, LA, USA.
- PD.7 AbdelBaky, M., Parashar, M. and Jordan, K.E., 2009, November. System Level Acceleration and Interactive Supercomputing. International Conference for High Performance Computing, Networking, Storage and Analysis (SC09), Portland, OR, USA.

Tutorials

- PT.1 Diaz-Montes, J., AbdelBaky, M. and Parashar, M., 2015, September. Enabling Software-Defined Federations using CometCloud. The 9th IEEE International Conference on Self-Adaptive and Self-Organizing Systems (SASO), Cambridge, MA, USA.
- PT.2 Parashar, M. and AbdelBaky, M., 2012, July. Federating HPC, Cyber-infrastructure and Clouds using CometCloud. Virtual School of Computational Science & Engineering Summer School, Bloomington, IN, USA.
- PT.3 AbdelBaky, M., Kim, H., Rodero, I. and Parashar, M., 2012, May. Developing and Deploying Applications on Federated Clouds using CometCloud. The 12th IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing (CCGrid), Ottawa, Canada.

PROFESSIONAL SERVICE

Workshop Proceedings Vice Chair	The 32 nd IEEE International Parallel & Distributed Processing Symposium (IPDPS 2018), Vancouver, Canada
Program Committee Member	The First International Workshop on Workflow Science (WoWS 2017) in conjunction with the 13 th IEEE eScience Conference in Auckland, New Zealand
Student Volunteer	The 31 st IEEE International Parallel & Distributed Processing Symposium (IPDPS 2017), Orlando, FL, USA
Student Volunteer	The 28 th International Conference for High Performance Computing, Networking, Storage and Analysis (SC15), Austin, TX, USA
Student Volunteer	The 22 nd ACM International Symposium on High-Performance Parallel and Distributed Computing (HPDC13), New York, NY, USA
Student Volunteer	The 25 th International Conference for High Performance Computing, Networking, Storage and Analysis (SC12), Salt Lake City, UT, USA
Student Volunteer	The 24 th International Conference for High Performance Computing, Networking, Storage and Analysis (SC11), Seattle, WA, USA

PROFESSIONAL AFFILIATION

2015 - Present	Association for Computing Machinery (ACM)
2012 - 2017	Society for Industrial and Applied Mathematics (SIAM)
2009 - Present	ETA KAPPA NU Electrical & Computer Engineering Honor Society
2005 - Present	Institute of Electrical and Electronics Engineers (IEEE)

CONTRIBUTION TO SOFTWARE PROJECTS & SCIENTIFIC APPLICATIONS

- [CometCloud](#) is an autonomic framework for enabling real-world applications on dynamically federated, hybrid infrastructure integrating (public & private) clouds, data-centers and Grids.
- **Discover** is a virtual, interactive and collaborative PSE that enables geographically distributed scientists and engineers to collaboratively monitor, and control high performance parallel/distributed applications using web-based portals.
- **iCode** is a framework that integrates CometCloud and Discover and leverages Deep Cloud to enable on-demand deployment and elastic abstractions on top of supercomputers (e.g., IBM Blue Gene).
- **C-Ports** is a framework that leverages CometCloud to support the deployment of Docker containers across multiple clouds and data centers.
- **ElVis** is a Scientific Graphics for Visualization and Monitoring.
- Dissipative Particle Dynamics (DL-Meso) is a particle-based simulation technique, which focuses on the meso-scale behavior of molecular systems
- Parallel in Time and NWChem with Pacific Northwest National Laboratory
- Medical Image Registration and Histopathology Image Analysis with Rutgers Cancer Institute
- Kepler Scientific Workflow and Rapid Analysis of Multiple Metagenomes with a Clustering and Annotation Pipeline (RAMMCAP) with San Diego Supercomputer Center
- MapReduce Acceleration using the Rutgers Protein Data Bank
- Asynchronous Replica Exchange using IMPACT and AMBER with Rutgers CBMB

- o Ocean Modeling – enabling data assimilation as a service with MIT EAPS
- o Implicit Parallel Accurate Reservoir Simulator (IPARS) and Ensemble Kalman Filter (EnKF) with University of Texas at Austin
- o Using mobile devices for volunteer computing services [Uncertainty-aware Resource Provisioning in Mobile Computing Grids for Real-time In-situ Data Processing](#)
- o Designed and implemented a web-based stock prediction application
- o Designed and implemented a system to offload complex computation to IBM Blue Gene/P supercomputer from a MATLAB front-end running on a personal computer
- o Designed and implemented a real-time Value at Risk (VaR) simulation on a BlackBerry mobile device with Bloomberg LP
- o Designed and implemented a HTTP server
- o Designed and implemented a simplified banking system
- o Designed and implemented a restaurant automation system