Curriculum Vitæ

Konstantin Läufer, PhD
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August 21, 2019

Contents

1 General Information

Degrees

1992 *PhD in Computer Science*
Department of Computer Science, Courant Institute of Mathematical Sciences, New York University, New York
Thesis Title: *Polymorphic Type Inference and Abstract Data Types*
Thesis Advisor: *Professor Benjamin F. Goldberg*
Thesis Co-Advisor: *Professor Martin Odersky*

1989 *Master of Science in Computer Science*
Department of Computer Science, Courant Institute of Mathematical Sciences, New York University, New York

Academic Experience

2005–present *Professor*
Department of Computer Science, Loyola University Chicago, Chicago, Illinois

2012–2018 *Department Chairperson*
Department of Computer Science, Loyola University Chicago, Chicago, Illinois

2005–2006 *Associate Dean*
Graduate School, Loyola University Chicago, Chicago, Illinois

1998–2005 *Associate Professor*
Department of Computer Science, Loyola University Chicago, Chicago, Illinois

2000–2003 *Visiting Associate Professor*
Department of Computer Science, University of Chicago, Chicago, Illinois
(part-time, during summers)

1992–1998 *Assistant Professor*
Department of Mathematical and Computer Sciences, Loyola University Chicago, Chicago, Illinois

1991 *Instructor*
Department of Computer Science, Courant Institute of Mathematical Sciences, New York University, New York

Academic Recognitions

1987–1992 Full assistantship support (tuition and stipend) from New York University

1985–1986 Full scholarship (tuition and stipend) from University of Konstanz, Germany, for participation in one-year graduate study-abroad program at Rutgers University, New Brunswick, New Jersey

Other Professional Experience

2001 *Lead Architect*
Business Logic Corporation, Inc., Chicago, Illinois
(full-time, while on unpaid leave from Loyola University Chicago)
Responsible for the technical architecture of the object model used by BLC's e-finance connectivity infrastructure to exchange data among financial record keepers and application providers. Converted the object model to a model-driven architecture (MDA) capable of supporting multiple target platforms. Defined the specific process for object model updates within the existing Rational Unified Process framework.

1989 *Pre-Doctoral Researcher*
IBM Research Division, T. J. Watson Research Center, Yorktown Heights, New York
Examined and compared various software modeling methods. Designed and implemented a tool for rapid prototyping by specifying reactive behavior.

1986–1987 *Programmer/Analyst*
Cobra GmbH, Konstanz, Germany
Designed and implemented various commercial personal-computer applications including bibliography database systems and a graphics-oriented editor for Chinese and Arabic text.

1983 *Programmer/Analyst*
Computing Center, University of Konstanz, Konstanz, Germany
Designed and implemented a full-screen mailbox system.

1983 *Programmer/Analyst*
Computer Gesellschaft Konstanz mbH (CGK), Konstanz, Germany
Implemented automated form reading applications using CGK's optical-character recognition (OCR) device CFT.

1982 *Intern*
Metalworking Training Shop, Telecommunication Division, Deutsche Bundespost, Freiburg, Germany
Eight-week full-time metalworking internship on hand and machine tools. Performed a range of processes such as filing, drilling, tapping, lathing, milling, soldering, brazing, and welding.

2 Research and Scholarship

This section describes my research and related activities. I have been active in various areas, ranging from theoretical to applied, including type theory, programming language design, software design patterns, concurrent and distributed systems, human-computer interaction, and computer science education.

Patents

1. U.S. Patent 6,609,089. T. Ball et al. *Method and apparatus for providing interactive services with multiple interfaces.* August 2003. This patent describes the use of lookaheads in interactive services. The intellectual contribution of this patent is to introduce the combination of lookaheads with reactive constraint graphs (covered by the following patent) for the flexible processing of user input. The broader impact of this work is to facilitate the construction of applications that support flexible, conversational voice interfaces.

2. U.S. Patent 6,529,863. T. Ball et al. *Method and apparatus for providing interactive services with multiple interfaces.* March 2003. This patent describes reactive constraint graphs and their use in interactive services. The intellectual contribution of this patent is to introduce reactive constraint graphs, a mechanism for specifying the abstract behavior of an interactive application or service. The broader impact of this work is to provide a foundation for the development of applications where a single behavioral component can be accessed from a broad range of devices.

Preliminary results on the work leading to these patents were published in the journal paper by T. Ball et al. listed below.

Peer-Reviewed Journal Publications and Book Chapters

1. K. Läufer and G. K. Thiruvathukal. Managing Concurrency in Mobile User Interfaces with Examples in Android. In Prasad, Gupta, Rosenberg, Sussman, and Weems (editors), *Topics in Parallel and Distributed Computing: Introducing Concurrency in Undergraduate Courses, Volume 2,* Springer Verlag, 2018, doi:10.1007/978-3-319-93109-8_9.

2. S Reisman, T Hatzopoulos, K Läufer, GK Thiruvathukal, C Putonti. A Polyglot Approach to Bioinformatics Data Integration: A Phylogenetic Analysis of HIV-1. *Evolutionary Bioinformatics* 12, EBO, 2016.

3. J. P. Kaylor, K. Läufer, and G. K. Thiruvathukal, RestFS: The Filesystem as a Connector Abstraction for Flexible Resource and Service Composition. In *Cloud Computing: Methodology, Systems, and Applications,* L. Wang et al., editors. Boca Raton, Florida, USA: CRC Press, Sep. 2011.

4. K. Läufer, G. Baumgartner, and V. F. Russo. Safe structural conformance for Java. *Computer J.*, 43(6):469-481, 2000.

5. R. Jagadeesan, K. Läufer, and V. Gupta. The Triveni Project. *ACM SIGSOFT Software Engineering Notes*, 25(1):59, 2000.

6. T. Ball, C. Colby, P. Danielsen, L. Jategaonkar Jagadeesan, R. Jagadeesan, K. Läufer, P. Mataga, and K. Rehor. Sisl: several interfaces, single logic. *Intl. J. Speech Technology*, 3(2):93–108, 2000.

7. C. Colby, L. Jategaonkar Jagadeesan, R. Jagadeesan, K. Läufer, and C. Puchol. The semantics of Triveni: a process-algebraic API for threads + events. In *Electronic Notes in Theoretical Computer Science*, Vol. 14, 2000.

8. K. Läufer. Type classes with existential types. *Journal of Functional Programming*, 6(3):485–517, 1996.

9. K. Läufer and M. Odersky. Polymorphic type inference and abstract data types. *ACM Transactions on Programming Languages and Systems*, 16(5):1411–1430, 1994.

Peer-Reviewed Conference Publications

1. K. Läufer, John O'Sullivan, and G. K. Thiruvathukal. Tests as Maintainable Assets Via Auto-generated Spies: A case study involving the Scala collections library's Iterator trait, In *Proc. 10th ACM Scala Symposium (Scala '19)*, London, UK, Jul. 2019, doi:10.1145/3337932.3338814.

2. WL Honig, K Läufer, GK Thiruvathukal. A framework architecture for student learning in distributed embedded systems. In *Proc. 10th IEEE International Symposium on Industrial Embedded Systems (SIES)*, 2015.

3. J. P. Kaylor, K. Läufer, and G. K. Thiruvathukal. Simplifying Domain Modeling and Memory Management in User-Mode Filesystems with the NOFS Framework. In *Proc. IEEE Intl. Conf. on Electro/Information Technology (EIT)*, May 2012.

4. D. B. Dennis, K. Läufer, and G. K. Thiruvathukal. Initial experience in moving key academic department functions to social networking sites. In *Proc. INSTICC 6th International Conference on Software and Data Technologies (ICSOFT)*, Sevilla, Spain, July 2011.

5. J. P. Kaylor, K. Läufer, and G. K. Thiruvathukal. REST on routers? preliminary lessons for language designers, framework architects, and app developers. In *Proc. INSTICC 6th International Conference on Software and Data Technologies (ICSOFT)*, Sevilla, Spain, July 2011.

6. K. Läufer, C. N. Sekharan, and G. K. Thiruvathukal. PDC Modules for Every Level: A Comprehensive Model for Incorporating PDC Topics into the Existing Undergraduate Curriculum. In *Proc. 1st NSF/IEEE-CS TCPP Workshop on Parallel and Distributed Computing Education (EduPar)*, Anchorage, Alaska, May 2011.

7. J. P. Kaylor, K. Läufer, and G. K. Thiruvathukal. RestFS: Resources and Services are Filesystems, Too. In *Proc. 2nd ACM International Workshop on RESTful Design at WWW 2011 (WS-REST)*, Hyderabad, India, March 2011.

8. J. P. Kaylor, K. Läufer and G. K. Thiruvathukal. Online Layered File System (OLFS): A Layered and Versioned Filesystem and Performance Analysis. In *Proc. IEEE Intl. Conf. on Electro/Information Technology (EIT)*, May 2010.

9. S. Herr, J. Shafaee, K. Läufer, G. K. Thiruvathukal, and G. Wirtz. Combining SOA and BPM technologies for cross-system process automation. In *Proc. 20th Intl. Conf. on Software Engineering and Knowledge Engineering (SEKE)*, San Francisco, CA, July 2008.

10. M. Bone, P. Nabicht, K. Läufer, and G. K. Thiruvathukal. Taming XML: objects first, then markup. In *Proc. IEEE Intl. Conf. on Electro/Information Technology (EIT)*, May 2008.

11. N. Mehta, Y. Kanitkar, K. Läufer, and G. K. Thiruvathukal. A model-driven approach to job/task composition in cluster computing. In *Proc. 9th Intl. Workshop on Java and Components for Parallelism, Distribution and Concurrency (IWJPDC)*, Long Beach, CA, March 2007. IEEE Computer Society.

12. J. Zhang, K. Läufer, and Z. Gong. Mockup-supported web requirements engineering. In *Proc. 2003 Intl. Conf. on Internet Computing (IC)*, Las Vegas, NV, June 2003.

13. P. Godefroid, L. J. Jagadeesan, R. Jagadeesan, and K. Läufer. Automated systematic testing for constraint-based interactive services. In *Proc. ACM SIGSOFT Foundations of Software Engineering (FSE)*, San Diego, CA, November 2000.

14. V. Gupta, L. J. Jagadeesan, R. Jagadeesan, X. Jiang, and K. Läufer. A constraint-based framework for prototyping distributed virtual applications. In *Proc. Principles and Practice of Constraint Programming (CP)*, Singapore, September 2000. Springer Verlag.

15. C. Colby, R. Jagadeesan, K. Läufer, and C. Sekharan. Interaction and concurrency in the curriculum—a sophomore course. In *Proc. OOPSLA Educators' Symposium*, Vancouver, Canada, October 1998.

16. C. Colby, L. J. Jagadeesan, R. Jagadeesan, K. Läufer, and C. Puchol. Design and implementation of Triveni: a process-algebraic API for threads + events. In *Proc. Intl. Conf. on Computer Languages (ICCL)*, Chicago, May 1998.

17. G. Baumgartner, K. Läufer, and V. F. Russo. An object model for building scalable applications. Position paper for *Advanced Topics Workshop, 4th USENIX Conf. on Object-Oriented Technologies (COOTS)*, Santa Fe, New Mexico, April 1998.

18. C. Colby, L. Jategaonkar Jagadeesan, R. Jagadeesan, K. Läufer, and C. Puchol. Objects and concurrency in Triveni. In *Proc. 4th USENIX Conf. on Object-Oriented Technologies (COOTS)*, Santa Fe, New México, April 1998.

19. K. Läufer. Using Java in the undergraduate computer science curriculum. In *Proc. 11th Annual Midwest Computer Conference (MCC)*, Springfield, Illinois, March 1997.

20. K. Läufer. An open environment for common gateway interface programming. In *Proc. 10th Annual Midwest Computer Conference (MCC)*, Chicago, March 1996.

21. M. Odersky and K. Läufer. Putting type annotations to work. In *Proc. 23rd ACM Symp. on Principles of Programming Languages (POPL)*, pages 54–67, St. Petersburg, Florida, January 1996.

22. K. Läufer and M. Odersky. Extending the Hindley/Milner system with existential and universal polymorphism, August 1995. *Workshop on Advances in Type Systems for Computing (ATSC)*, Cambridge, England. Preliminary version of the POPL '96 paper.

23. K. Läufer. A framework for higher-order functions in C++. In *Proc. USENIX Conf. Object-Oriented Technologies (COOTS)*, Monterey, California, June 1995.

24. K. Läufer. Combining type classes and existential types. In *Proc. Latin American Informatics Conf. (PANEL)*, Atizapán, México, September 1994. ITESM-CEM. Conference presentation given in the Spanish language. Preliminary version of the JFP '96 paper.

25. K. Läufer and M. Odersky. Self-interpretation and reflection in a statically typed language. In *Proc. OOPSLA Workshop on Reflection and Metalevel Architectures*, Washington, D. C., October 1993. ACM.

26. K. Läufer and M. Odersky. An extension of ML with first-class abstract types. In *Proc. ACM SIGPLAN Workshop on ML and its Applications*, San Francisco, California, June 1992. Preliminary version of the TOPLAS '94 paper.

27. K. Läufer and M. Odersky. Reflection in type systems. In *Proc. OOPSLA Workshop on Reflection and Metalevel Architectures*, Phoenix, Arizona, October 1991. ACM. Preliminary version of the OOPSLA Reflection '93 paper.

28. K. Läufer and M. Odersky. Type classes are signatures of abstract types. In *Proc. Phoenix Seminar and Workshop on Declarative Programming*, ESPRIT Basic Research Series, Sasbachwalden, Germany, November 1991. Springer Verlag.

29. F. Henglein and K. Läufer. Programming with structures, functions, and objects. In *Proc. XVII Latin American Informatics Conference (PANEL)*, pages 333–352, Caracas, Venezuela, 1991. Universidad Simón Bolívar. Available as Technical Report NYU-CS-TR 556, New York University, 1991.

Other Journal Publications

1. K. Läufer, G. K. Thiruvathukal, D. B. Dennis, Moving Academic Department Functions to Social Networks and Clouds: Initial Experiences. *IEEE Computing in Science & Engineering,* 13(5), 2011, doi:10.1109/MCSE.2011.85.

2. G. K. Thiruvathukal, K. Hinsen, K. Läufer, and J. Kaylor. Virtualization for Computational Scientists. *IEEE Computing in Science & Engineering,* 12(4), 2010.

3. K. Hinsen, K. Läufer, and G. K. Thiruvathukal. Essential Tools: Version Control Systems. *IEEE Computing in Science & Engineering,* 11(6), 2009.

4. K. Läufer and G. K. Thiruvathukal. The Promises of Typed, Pure, and Lazy Functional Programming: Part II. *IEEE Computing in Science & Engineering,* 11(5), 2009.

5. K. Läufer, G. K. Thiruvathukal, R. Nishimura, and C. Ramírez Martínez-Eiroa. Putting a slug to work. *IEEE Computing in Science & Engineering,* 11(2):62–68, 2009.

6. K. Läufer and G. K. Thiruvathukal. What I did on my summer vacation. *IEEE Computing in Science & Engineering,* 10(6):76–81, 2008.

7. K. Läufer. A Stroll through Domain-Driven Development with Naked Objects. *IEEE Computing in Science & Engineering,* 10(3):76–83, 2008.

8. K. Läufer, G. K. Thiruvathukal, and B. González. A hike through post-EJB J2EE web application architecture, part III. *IEEE Computing in Science & Engineering,* 9(1):82–95, 2007.

9. G. K. Thiruvathukal, K. Läufer, and B. González. Unit testing considered useful. *IEEE Computing in Science & Engineering,* 8(6):76–87, 2006.

10. K. Läufer. A hike through post-EJB J2EE web application architecture, part II. *IEEE Computing in Science & Engineering,* 8(2):86–94, 2006.

11. K. Läufer. A hike through post-EJB J2EE web application architecture. *IEEE Computing in Science & Engineering*, 7(5):80–88, 2005.

12. G. K. Thiruvathukal and K. Läufer. Plone and content management. *IEEE Computing in Science & Engineering*, 6(4):88–95, 2004.

13. G. K. Thiruvathukal and K. Läufer. Natural XML for data binding, processing, and persistence. *IEEE Computing in Science & Engineering*, 6(2):86–92, 2004.

Theses, Technical Reports, and Working Papers

1. K. Läufer, J. O'Sullivan, and G. K. Thiruvathukal. *Auto-generated Spies Increase Test Maintainability.* arXiv preprint, 2018.

2. GK Thiruvathukal, NJ Hayward, and K Läufer, Metrics Dashboard: *A Hosted Platform for Software Quality Metrics.* arXiv preprint arXiv:1804.02053, 2018.

3. K. Läufer and G. K. Thiruvathukal. *Concurrency: A User-Centric Approach.* Loyola University Chicago, Technical Report, June 2014.

4. J. P. Kaylor, K. Läufer, and G. K. Thiruvathukal. *Naked Object File System (NOFS): A Framework to Expose an Object-Oriented Domain Model as a File System.* Loyola University Chicago, Technical Report, May 2010.

5. M. Gutman, C. Kim, K. Läufer, S. Radhakrishnan, and C. Sekharan. *GroupSpeak: A workflow specification language with support for service aggregation.* In Proc. *IEEE 7th Intl. Conf. on Web Services (ICWS)*, poster track, July 2009.

6. N. Mehta, Y. Kanitkar, K. Läufer, and G. K. Thiruvathukal. A model-driven approach to job/task composition in cluster computing. *Proc. 2004 Midwest Software Engineering Conference (MSEC),* Chicago, Illinois, USA, April 2004.

7. T. Bai, C. K. Chung, K. Läufer, D. Rockwell, and G. K. Thiruvathukal. *A multi-platform application suite for enhancing South Asian language pedagogy.* Technical Report, Loyola University Chicago, September 2003.

8. K. Läufer. *What functional programmers can learn from the visitor pattern.* Technical Report, Loyola University Chicago, March 2003.

9. G. Baumgartner, M. Jansche, and K. Läufer. *Half & Half: Multiple Dispatch and Retroactive Abstraction for Java.* Technical Report OSU-CISRC-5/01-TR08, Department of Computer and Information Science, The Ohio State University.

10. G. Baumgartner, K. Läufer, and V. F. Russo. *On the interaction of object-oriented design patterns and programming languages.* Technical Report CSD-TR-96-020, Department of Computer Sciences, Purdue University, February 1996.

11. K. Läufer. Toward a formal description of Griffin. Working paper, December 1993.

12. K. Läufer. *Polymorphic Type Inference and Abstract Data Types*. PhD thesis, New York University, July 1992. Available as Technical Report NYU-CS-TR 622, December 1992, from New York University, Department of Computer Science.

13. M. Harrison, F. Henglein, C.-H. Hsieh, and K. Läufer. Polymorphism and type abstraction in Griffin. In *Proc. DARPA CPL Principal Investigator Meeting*, Los Angeles, California, April 1992.

14. Griffin Prototyping Group. *Reference Manual for the Griffin Prototyping Language*. New York University, May 1991. Presented at DARPA Common Prototyping Language Working Group Meeting, Washington, D. C.

15. K. Läufer. *Three approaches to transformational programming — a comparative survey.* Technical Report NYU-CS-TR 555, Department of Computer Science, New York University, April 1991.

16. K. Läufer. *Towards rapid prototyping by specifying reactive behavior.* Working paper, IBM T. J. Watson Research Center, October 1989.

Public Software Releases and Documentation

1. K. Läufer and G. K. Thiruvathukal, *Loyola Pervasive Computing Research and Teaching* github.com/LoyolaChicagoCode, 2009–present.

2. K. Läufer, *Picplacr,* a command-line tool for geotagging pictures in a Flickr album (Python), github.com/klaeufer/picplacr, 2016.

3. J. Kaylor, K. Läufer, and G. K. Thiruvathukal, *RestFS Filesystem* code.google.com/p/restfs, 2010–2012.

4. J. Kaylor, K. Läufer, and G. K. Thiruvathukal, *Naked Objects Filesystem (NOFS)* code.google.com/p/nofs, 2009–2012.

5. J. Kaylor, K. Läufer, and G. K. Thiruvathukal, *Layered/Versioned Filesystem (OLFS)* code.google.com/p/olfs, 2009–2010.

6. K. Läufer, *Asterizmo Asterisk and Gizmo5 telephony integration project* code.google.com/p/asterizmo, 2008–2014. Over 1800 downloads so far.

7. Contributor to *Gastify*, a client for app_notify extension of the Asterisk telephony engine gastify.googlepages.com, 2008–2009.

8. Contributor to *Restlet*, a widely used lightweight REST framework www.restlet.org, 2008–2009.

9. K. Läufer, *The Trull (TRiveni ULtra Light) framework for Java*, trull.googlecode.com, 2004 and 2005. Over 230 downloads so far.

10. G. K. Thiruvathukal and K. Läufer, *Natural XML*, sourceforge.net/projects/xir, 2003. Over 30 downloads so far.

11. R. Jagadeesan and K. Läufer, *The Triveni framework for Java*, sourceforge.net/projects/triveni, 2003. Over 190 downloads so far.

12. L. J. Jagadeesan and K. Läufer, *Sisl: Several Interfaces, Single Logic*, www.bell-labs.com/user/lalita/sisl-external.html, 2000.

13. K. Läufer and W. Mehl. *Cobra Address User Manual*. Cobra GmbH, 1987.

14. K. Läufer. *Cobra Litsy User Manual*. Cobra GmbH, 1986.

15. R. Dierenbach, H.-E. Erbs, and K. Läufer. *MailBox User Manual and Administration Guide*. Universität Konstanz, 1984.

Funded Extramural Grants

1. K. Läufer, C. Sekharan, and G. K. Thiruvathukal. *NVIDIA equipment award for Early Adopters* under the NSF/IEEE-TCPP Curriculum Initiative on Parallel and Distributed Computing, January 2012.

2. R. Greenberg (PI), W. Honig, K. Läufer, C. Putonti, and G. K. Thiruvathukal. *Improving Metropolitan Participation to Accelerate Computing Throughput and Success (IMPACTS).* National Science Foundation, Broadening Participation in Computing (BCP) program, Award #0837769, $141,711; 2008-2011.

3. W. Honig, K. Läufer, and G. K. Thiruvathukal. *Learning the Wonders of Computing with Wireless Collaboration.* HP Technology for Teaching Grant #1900784, $68,000; 2007–2008.

4. G. K. Thiruvathukal (PI), C. Sekharan (co-PI), and K. Läufer (paid senior personnel). *ITR: The Community Information Technology Entrepreneurship Project.* National Science Foundation, Information Technology Research (ITR) program, Award #0205652, $1,000,000; 2002–2005.

5. K. Läufer (PI) and George K. Thiruvathukal. *A multi-platform application suite for enhancing South Asian language pedagogy.* South Asia Language Resource Center (SALRC) Mini-Grant, $5,000; 2004–2005.

6. R. Jagadeesan (PI) and K. Läufer. *The Triveni Project*, National Science Foundation, Software Engineering and Languages program, Award #9901071, $153,988; 1999–2002.

7. P. Dordal, R. Jagadeesan (PI), K. Läufer, and C. Sekharan. Sun Microsystems, Academic Equipment Grant, $89,000; 1999.

8. P. Dordal, R. Jagadeesan, K. Läufer (PI), and C. Sekharan. Microsoft Instructional Lab Grant, Grant #190, $70,000; 1996–1998.

9. K. Läufer. European Union Human Capital and Mobility Grant, August 1995.

Funded Internal Grants

1. G. K. Thiruvathukal (PI), N. Tuchman, J. Frendreis, P. Geddes, and D. Slavsky, *Research Stimulation: Chicago Clean Air, Clean Water,* $10,000. Renewed in Fall 2009 for an additional $10,000. *Key contributor on proposal and ensuing project.*

2. K. Läufer (PI). *Fall 2009 Faculty Fellow of Center for Urban Environmental Research and Policy (CUERP).* Award includes $1,500 stipend.

3. K. Läufer. *Mulcosoft: Programming Languages and Frameworks for Multi-Core Systems,* Loyola Research Support Grant, $3,000; 2007.

4. K. Läufer. *TriveniLite: A Framework for Defining and Composing Tasks in Concurrent Applications*, Loyola Summer Research Stipend, $4,000; 2004.

5. K. Läufer (PI) and George K. Thiruvathukal. *Handheld and Wireless Technology in the Classroom: A Concept/Research Laboratory for Teaching South Asian Languages*, Loyola College of Arts and Sciences Research Seed Grant, $2,500; 2003.

6. K. Läufer. *A Compositional Language for Concurrent Programming,* Loyola Summer Research Stipend, $6,000; 1998.

7. K. Läufer. Loyola Faculty Development Initiative Award. 1998.

8. K. Läufer. *Type Inference for Objects, Classes, and Patterns,* Loyola Summer Research Stipend, $6,000; 1996.

9. K. Läufer. Loyola Research Support Grant, $2,000; 1995.

10. K. Läufer. *Polymorphic Type Inference and Object-Oriented Programming*, Loyola Summer Research Stipend, $5,000; 1993.

11. K. Läufer. NYU Graduate School of Arts and Sciences Travel Award; 1991.

Consulting Activities

2012–2013 Ontoadaptive, LLC., Chicago, Illinois
Providing expertise, leadership, and mentoring in support of OA's efforts to improve the quality and efficiency of healthcare delivery through information technology innovation.

2008 3-2-1 Launch!, Elmhurst, Illinois
Participated in two-day intensive ideation session for innovating a large insurance provider's online user experience.

2003–2004 Nimkathana, Inc., Chicago, Illinois
Responsible for the architectural framework for Nimkathana's research and development in high-performance computing and distributed applications. Also in charge of identifying, evaluating, and selecting emerging technologies that enhance Nimkathana's activities.

2001–2003 OneBlueWorld, Inc., Chicago, Illinois
Provided high-level technical guidance, strategic technology planning, and management of technical resources to help OneBlueWorld deliver technology services that enhance learning. Established the technological framework for OneBlueWorld's Pilsen Campus project, a hosted portal designed to integrate students, parents, teachers, and administrators in Chicago's predominantly Latino Pilsen school cluster.

2000 Blue Meteor, Inc., Chicago, Illinois
Performed a system audit of Blue Meteor's eCatapult application-aggregation platform. Made recommendations to improve the customization process and its required architectural support.

1996–2000 Bell Laboratories, Lucent Technologies, Naperville, Illinois
Conducted research on MAWL and Sisl, domain-specific languages for interactive web, voice, and wireless services.

1993 Department of Computer Science, Courant Institute of Mathematical Sciences, New York University, New York
Developed a formal semantic description of the prototyping language Griffin.

Presentations at Professional Meetings and Academic Institutions

1. K Läufer, GK Thiruvathukal, and MC Lewis. *Experiences with Scala Across the College-Level Curriculum.* Invited talk, Scala Days, Chicago, 2017.

2. GK Thiruvathukal, S Shilpika, NJ Hayward, S Aguiar, K Läufer. Towards Sustainable Digital Humanities Software. Position paper at the *Workshop on Sustainable Software for Science: Practice and Experiences (WSSSPE),* 2015.

3. B. Gathright, K. Läufer, A. Parsa, and G. K. Thiruvathukal. Middleware for Collaborative Distributed/Mobile Applications: XMPP or Reactive HTTP? (Poster). To appear in *Proc. 4th Greater Chicago Area System Research Workshop (GCASR)*, Chicago, Illinois, April 2015.

4. M. C. Lewis, K. Läufer, and G. K. Thiruvathukal. Scala for introductory CS and parallelism (Workshop). In *Proc. 45th ACM Technical Symposium on Computer Science Education*, Atlanta, Georgia, March 2014.

5. S. Reisman, C. Putonti, G. K. Thiruvathukal, K. Läufer. A Polyglot Approach to Bioinformatics Data Integration: Phylogenetic Analysis of HIV-1. In *Proc. 2nd Greater Chicago Area System Research Workshop (GCASR)*, Evanston, Illinois, May 2013.

6. P. Stasiuk, K. Läufer, and G. K. Thiruvathukal. Network Technologies used to Aggregate Environmental Data (Poster). In *Proc. 2nd Greater Chicago Area System Research Workshop (GCASR)*, Evanston, Illinois, May 2013.

7. T. Delgado Dias, X. Yan, K. Läufer, and G. K. Thiruvathukal. Building Capable, Energy-Efficient, Flexible Visualization and Sensing Clusters from Commodity Tablets (Poster). In *Proc. 2nd Greater Chicago Area System Research Workshop (GCASR)*, Evanston, Illinois, May 2013.

8. M. C. Lewis, K. Läufer, and G. K. Thiruvathukal. Using Scala strategically across the undergraduate curriculum (Workshop). In *Proc. 44th ACM Technical Symposium on Computer Science Education*, Denver, Colorado, March 2013.

9. K. Läufer, C. N. Sekharan, G. K. Thiruvathukal, and J. P. Kaylor. *Early Adopter Report: PDC Modules for Every Level: A Comprehensive Model for Incorporating PDC Topics into the Existing Undergraduate Curriculum.* Poster at 2nd NSF/IEEE-CS TCPP Workshop on Parallel and Distributed Computing Education (EduPar), Shanghai, China, May 2012.

10. D. B. Dennis, K. Läufer, and G. K. Thiruvathukal. *Initial experience in moving key academic department functions to social networking sites.* 6th International Conference on Software and Data Technologies (ICSOFT), Sevilla, Spain, July 2011.

11. J. P. Kaylor, K. Läufer, and G. K. Thiruvathukal. *REST on routers? preliminary lessons for language designers, framework architects, and app developers.* 6th International Conference on Software and Data Technologies (ICSOFT), Sevilla, Spain, July 2011.

12. K. Läufer, C. N. Sekharan, and G. K. Thiruvathukal. *PDC Modules for Every Level: A Comprehensive Model for Incorporating PDC Topics into the Existing Undergraduate Curriculum.* 1st NSF/IEEE-CS TCPP Workshop on Parallel and Distributed Computing Education (EduPar), Anchorage, Alaska, May 2011.

13. K. Läufer and G. K. Thiruvathukal. *Pervasive Systems Research at LUC: An Overview.* Presented to computer science faculty at DePaul University, November 2010.

14. Panelist at the Open Source Symposium held by the Saper Law Offices, February 2009.

15. S. Herr, J. Shafaee, K. Läufer, G. K. Thiruvathukal, and G. Wirtz. *Combining SOA and BPM technologies for cross-system process automation.* 20th Intl. Conf. on Software Engineering and Knowledge Engineering (SEKE), July 2008.

16. B. González and K. Läufer. *Unit-testing J2EE Applications.* Presented at Loyola's Emerging Technologies Laboratory, November 2006.

17. K. Läufer. *Trull: TRiveni ULtra Light.* Presented at Loyola's Emerging Technologies Laboratory, November 2006, and at DePaul University, Chicago, October 2005.

18. S. Ahmed, I. Fatima, T. Joseph, Y. Kanitkar, K. Läufer, N. Mehta, B. Slusarek, and G. K. Thiruvathukal. *The Loyola Concurrent, Parallel, and Distributed Computing Group (Poster and Tool Demo).* 2004 Midwest Software Engineering Conference (MSEC), Chicago, Illinois, USA, April 2004.

19. T. Bai, C. K. Chung, K. Läufer, D. Rockwell, and G. K. Thiruvathukal. *A multi-platform application suite for enhancing South Asian language pedagogy (Tool Demo).* 2003 Midwest Software Engineering Conference (MSEC), Chicago, Illinois, USA, June 2003.

20. K. Läufer and S. Ladha. TriveniLite: *A framework for defining and composing tasks in concurrent applications.* Fall Meeting of the Midwest Society for Programming Languages and Systems/Midwest SIGPLAN, Robert Morris College, Chicago, November 2002.

21. K. Läufer. *Modularity and Reuse in Triveni.* Invited colloquium talk, given at the Illinois Institute of Technology, Chicago, December 2001.

22. K. Läufer. *Sisl: Several Interfaces, Single Logic.* Invited colloquium talk, given at the University of Konstanz (Germany), July 2000.

23. T. Ball, C. Colby, K. Cox, P. Danielsen, S. Hibino, L. Jategaonkar Jagadeesan, R. Jagadeesan, D. Mantilla, P. Mataga, K. Rehor. *Sisl: several interfaces, single logic.* Fall Meeting of the Midwest Society for Programming Languages and Systems/Midwest SIGPLAN, Illinois Institute of Technology, Chicago, October 1999.

24. K. Läufer. *Components and Concurrency in Triveni.* Invited colloquium talk, given at New York University, May 1999, at Ohio State University, June 1999, and in the German language at the University of Konstanz (Germany), July 1999, and at the École Polytechnique Fédérale de Lausanne (Switzerland), August 1999.

25. C. Colby, L. Jategaonkar Jagadeesan, R. Jagadeesan, K. Läufer, and C. Puchol. *Components and concurrency in Triveni.* Spring Meeting of the Midwest Society for Programming Languages and Systems/Midwest SIGPLAN, Purdue University, West Lafayette, Indiana, April 1999.

26. K. Läufer. *Program structuring mechanisms in Java.* Java/JVM Workshop, Indiana University, Bloomington, Indiana, June 1997.

27. K. Läufer. *Invited panel discussion at the* 11th Annual Midwest Computer Conference (MCC) *on the best language for teaching introductory computer science, March 1997.*

28. K. Läufer. *A Framework for Higher-Order Functions in C++.* Invited colloquium talk, given in the Spanish language at the University of Tarapacá, Arica (Chile), December 1996.

29. K. Läufer. *An Open Environment for Common Gateway Interface Programming.* Invited colloquium talk, given at Bell Laboratories (Lucent Technologies), Naperville, Illinois, March 1996.

30. K. Läufer. *Interactive web applications based on finite state machines.* Symp. Information Systems Analysis and Synthesis (ISAS), Baden-Baden, Germany, August 1995. **Invited paper.**

31. K. Läufer. *Type Classes with Existential Types.* Invited colloquium talk, given at Purdue University and AT&T Bell Laboratories, Naperville, Illinois, September 1994.

32. K. Läufer. *Toward a Formal Description of Griffin.* Invited colloquium talk, given at New York University, June 1993.q

33. K. Läufer. *Polymorphic type inference and object-oriented programming.* Fall Meeting of the Midwest Society for Programming Languages and Systems/Midwest SIGPLAN, Chicago, November 1992.

National and International Recognition and Impact

- Google Scholar:**961 citations**, **h-index: 16, i10-index: 21**.

- GitHub:**603 contributions during the last 12 months.**

3 Service

This section describes my involvement in various areas of service, including professional, university, college, department, and community service.

Department Service

- *Graduate Program Director (GPD)* for Computer Science and Software Engineering, 2019–present.

- *Chairperson*, 2012–2018.

    - Provided leadership to fifteen full-time faculty in teaching, research, and service; managed twenty part-time teaching faculty; and supervised an administrative staff of three (2.3 FTE).
    - Oversaw and managed undergraduate and graduate programs in computer science, software engineering, information technology, bioinformatics, and various minors.
    - Also responsible for budget management, strategic planning, hiring, annual performance evaluation, enrollment management, curriculum development, tenure and promotion process, program review, assessment, and professional development of faculty and staff.
    - In collaboration with the School for Continuing and Professional Studies (SCPS), reestablished the Computer Science/Information Technology Program Advisory Committee (PAC) consisting of about 30 business and industry leaders who support the development, growth, and sustainability of the department through strategic direction.
    - *Oversaw 134% growth in the number of undergraduate majors in line with national trends. Advocated for six new full-time and tenure-track positions and successfully hired exceptional candidates for all positions.*

- *Member of the Bioinformatics Faculty*, 2007–present.

- *Co-director, Emerging Technologies Laboratory (ETL)*, 2006–present.

- *Chair and/or member, Rank and Tenure Committee*, 2005–present.

- Co-developed the department's social networking presence, 2011–2015.

- *Undergraduate Internship Director*, 2010–2013.

- Conducting the annual *student exit survey*, 2005–2012.

- *Computing Infrastructure Committee*, 2003–2012.

- *Co-advisor to the Loyola ACM Student Chapter*, 2002–2005.

- Represented the department at various *open houses* for prospective students, 1996–present.

- Participated in several *phonathons* targeting prospective students, 1996–present.

- *Chair, Rank and Tenure Guidelines Review Committee*, 2011.

- *Chair, Non-Tenure-Track Search Committee*, 2010–2011.

- *Co-chair, Academic Program Review Committee,* 2007–2009.

- *Bioinformatics Search Committee,* 2006–2007.

- *Learning Outcomes Assessment Committee,* 2004–2006.

- *Undergraduate Program Director,* 2004. Responsibilities include coordinating the undergraduate advising process. Also leading the ongoing undergraduate curriculum reform initiative, as well as the revival of the 2+2 articulation programs with community colleges and other feeder institutions.

- *Undergraduate Curriculum Reform Initiative,* 2004. The objectives of this initiative are as follows: (i) significantly streamline the set of required courses for the major by focusing on those courses that enhance the learning outcomes; (ii) free up the final two years to exploring tracks, project work, or (possibly) a senior thesis; (iii) make the existing BS/MS dual-degree program more attractive by alleviating undergraduate/graduate course duplication. The resulting proposal has been approved by Academic Council.

- *Graduate Curriculum Reform Initiative,* 2004. This initiative has resulted in the proposal of four new graduate programs to replace the existing Master of Science in Computer Science program: Master of Science in Software Technology, Master of Science in Information Technology, Master of Science in Scientific and Technical Computing, and Master of Education/Technology Specialist. The first three programs have already been approved by the Graduate Council Executive Committee.

- *Water Tower Campus (WTC) Planning Committee,* 2004.

- *Chair, Peer Review Panel for Faculty Market Equity Program,* 2004.

- *Chair, Computing Infrastructure Committee,* 2002–2003. Provided strategic leadership for computing within the computer science and math/stat departments. Key contribution in this CTO-like role was to improve departmental processes using current best-of-breed technologies, in particular, *Mailman* and *Plone*; and to propose and carry out various key infrastructure improvements including a forward-looking lab.

- *Director of Computer Science Programs,* 2000–2001. Prepared the programs for the transition to a separate department. Responsible for planning and efficient operation of the graduate, undergraduate, professional/certificate, and online computer science programs.

- *Assistant Chair,* 1998–2000. Responsibilities included course scheduling and hiring of part-time instructors.

- *Co-chair, Loyola Mathematical and Computer Sciences Colloquium,* 1996–2001.

- *Computer Lab Committee,* 1992–2001. Provided assistance to the department as a *Windows 2000/XP, Macintosh OS X, and Unix resource* and system administrator. Contributions include walk-in, phone, and email consultation; and on-site installation and customization of user software. Also involved in evaluating commercial software for suitability for teaching.

- *Graduate Committee* for computer science, 1992–2001.

- *Undergraduate Curriculum Committee* for computer science, 1992–2001.

- *Professional Programs Committee* for computer science, 1992–2001.

- *Search Committee* for computer science, 1992–2001.

- *Faculty Status Committee* for computer science, 1992–2001.

College Service

- *Rank, Tenure, and Leave Committee*, 2006–2009.

- *Academic Council,* 2004.

- *Curriculum Committee of the Academic Council,* 2004.

University Service

- *Faculty Development Review Committee*, 2018–2019

- *Architecture Review Board for Information Technology Services*, 2007.

- *Committee on Educational Opportunities for Alumni*, 2005.

- *Director of Research, Center for Information Management and Technology* (CIMT), 2000–2001.

- *Committee on University-Wide Academic Computing Services* (CUWACS), 1996–2000.

Peer Reviewing

- Numerous book reviews for Addison-Wesley, Benjamin-Cummings, Cambridge University Press, Dekker, Macmillan, Prentice-Hall, Scott-Jones, and Wiley, 1992–present.

- Journal of Systems and Software, 2011.

- IEEE Transactions on Learning Technologies, 2010–2011.

- Software Practice & Experience journal, multiple articles, 2010.

- Elsevier Journal of Systems and Software, 2009.

- 20th International Workshop on Languages and Compilers for Parallel Computing (LCPC 2007), 2007.

- ACM Symposium on Principles of Programming Languages (POPL 2005), 2004.

- Software Practice and Experience (SP&E), Special Issue on Experiences with Auto-adaptive and Reconfigurable Systems, 2004.

- International Conference on Functional Languages (ICFP), 2003.

- Journal of Functional Programming (JFP), 2002.

- ACM Transactions on Internet Technology (TOIT), 2002.

- Wiley Internet Encyclopedia, 2002.

- International Journal of Parallel and Distributed Systems and Networks, 2000.

- Symposium on Principles and Practice of Declarative Programming (PPDP 2000), 2000.

- Software Practice and Experience (SP&E), 2000.

- Information and Computation (I&C), 1998.

- Multiconference on Systems, Cybernetics, and Informatics (SCI), 1998.

- International Symposium on Theoretical Aspects of Computer Software (TACS), 1997.

- Symposium on Information Systems Analysis and Synthesis (ISAS), 1997.

- Symposium on Programming Language Implementation and Logic Programming (PLILP), 1997.

- Conference on Functional Programming and Computer Architecture (FPCA), 1993.

- Journal of Functional Programming (JFP), 1993.

Conference Program Committees

- IEEE 8th International Conference on Big Data and Cloud Computing (BDCloud 2018)

- INSTICC International Conference on Data Technologies and Applications (DATA 2018)

- INSTICC International Conference on Software Engineering and Applications (ICSOFT 2018)

- INSTICC International Conference on Data Technologies and Applications (DATA 2017)

- INSTICC International Conference on Software Engineering and Applications (ICSOFT 2017)

- INSTICC 5th International Joint Conference on Pervasive and Embedded Computing and Communication Systems (PECCS 2015)

- IEEE 5th International Conference on Big Data and Cloud Computing (BDCloud 2015)

- INSTICC International Conference on Data Technologies and Applications (DATA 2014)

- INSTICC International Conference on Software Engineering and Applications (ICSOFT-EA 2014)

- INSTICC International Conference on Software Paradigm Trends (ICSOFT-PT 2014)

- INSTICC International Conference on Data Technologies and Applications (DATA 2013)

- INSTICC International Conference on Software Engineering and Applications (ICSOFT-EA 2013)

- INSTICC International Conference on Software Paradigm Trends (ICSOFT-PT 2013)

- IEEE 1st International Conference on Services Economics (SE 2012)

- INSTICC International Conference on Data Technologies and Applications (DATA 2012)

- INSTICC International Conference on Software Paradigm Trends (ICSOFT 2012)

- IEEE International Conference on Cloud and Green Computing (CGC 2011)

- IARIA International Conference on Cloud Computing (CLOUD 2011)

- Chicago Colloquium on Digital Humanities and Computer Science (DHCS 2011)

- INSTICC International Conference on Software and Data Technologies (ICSOFT 2011)

- International Conference on Software Engineering and Knowledge Engineering (SEKE 2011)

- IEEE World Congress on Services (SERVICES 2011)

- IEEE International Conference on Cloud Computing (CLOUD 2010)

- INSTICC International Conference on Software and Data Technologies (ICSOFT 2010)

- International Conference on Software Engineering and Knowledge Engineering (SEKE 2010)

- IEEE World Congress on Services (SERVICES 2010)

- INSTICC International Conference on Software and Data Technologies (ICSOFT 2009)

- IEEE International Conference on Web Services (ICWS 2009)

- International Conference on Software Engineering and Knowledge Engineering (SEKE 2009)

- IEEE International Conference on Web Services (ICWS 2008)

- IEEE International Conference on Web Services (ICWS 2007)

- IEEE International Conference on Web Services (ICWS 2006)

- Midwest Software Engineering Conference (MSEC 2004)

- Symposium on Information System Analysis and Synthesis (ISAS 1996)

- Symposium on Information System Analysis and Synthesis (ISAS 1995)

Other Professional Service

- *Voting member*, Association for Computing Machinery (ACM), 1992–present.

- *External PhD Dissertation Reviewer* for Christopher Jones, PhD student in Computer Science, DePaul University, 2011–2016.

- *Co-editor,* Scientific Programming Department, IEEE Computing in Science and Engineering (CiSE) journal, 2005–2015.

- *Board Member,* Chicago Java Users Group (CJUG), 2007–2011.

- *Expert Reviewer*, Natural Sciences and Engineering Research Council of Canada (NSERC), 2006–2010.

- *External PhD Dissertation Reviewer* for Jordan Liu, PhD student in Computer Science, DePaul University, 2007–2010.

- *External Reviewer* for a tenure and promotion case to Associate Professor, 2009.

- *Co-president*, Midwest Society for Programming Languages and Systems, 1998–2007.

- *External Reviewer* for a tenure and promotion case to Associate Professor, 2007.

- *Local Co-organizer*, 2007 North American Computers and Philosophy Conference (NA-CAP), 2006–2007.

- *Local Co-organizer,* Midwest Society for Programming Languages and Systems (MSPLS) Spring 2007 Workshop, 2006–2007.

- *External Master's Thesis Advisor* to Sebastian Herr, student in the Department of Computer Science, University of Bamberg, Germany, 2006–2007.

- *External PhD Examiner/Dissertation Reader* for Gary von Itzstein, PhD student in the Department of Computer Science, University of South Australia, 2005.

- *External Consultant* for the Academic Vice President at a Jesuit peer university to help the university set the strategic direction for the future of its Computer and Information Science and Technology programs, 2005.

- *System Administrator*, local mirror site of the *Pizza/GJ* site, 1998–2005.

- *Expert on Special Knowledge Determination* for work visa applicants; provided opinion letters to immigration attorneys in five separate cases, 2003.

- *External Master's Thesis Committee Member* for Mr. Christopher Chung, graduate student in computer science at the University of Chicago, 2003.

- *External Reviewer* for a promotion case to Professor, 2002.

- *Maintainer*, permanent general web site for the International Conference on Functional Programming (ICFP), 1999–2006.

- *Publicity Chair*, International Conference on Functional Programming (ICFP), 1999.

- *Co-chair*, Midwest Society for Programming Languages and Systems/Midwest SIGPLAN Spring 1998 Workshop.

- *Finance Chair and Local Arrangements Chair*, IEEE International Conference on Computer Languages (ICCL), 1998.

- *Publications Chair*, Second Annual Ethics and Technology Conference (ETC), 1997.

- *PhD Thesis Advisory Committee Member* for Gerald Baumgartner, Department of Computer Science, Purdue University, 1996.

- *Publications Chair*, Midwest Computing Conference (MCC), 1996.

- *Publications Chair*, First Annual Ethics and Technology Conference (ETC), 1996.

- *Co-chair*, Midwest Society for Programming Languages and Systems/Midwest SIGPLAN Fall 1995 Workshop.

- *Student member*, Association for Computing Machinery (ACM), 1989–1992.

Community Service

- *Consultant (pro-bono)*, 1998–present. Helping several older neighbors in residential highrise with occasional computer-related problems.

- *Member, Telecommunication Commission*, 2011–2012. Providing technical expertise to owners' association in residential highrise.

- *Advisory Board Member, Green Street Project*, 2003–2007. Green Street Project, an Illinois non-profit corporation, was founded to create healthy, socially responsible economic value in under-served neighborhoods through grassroots development. Green Street Project focuses on bringing in critical revenue for revitalizing communities and its residents by exporting the value from the neighborhoods.

4 Teaching

This section summarizes my teaching activities at Loyola University Chicago, including courses taught, course and curriculum development, student involvement in research, and advising.

Courses Taught at Loyola During the Last Five Years

During the last five years, my teaching has focused on the following courses, offered at the advanced undergraduate and graduate level. I developed or co-developed most of them, and further details can be found below. These courses combine solid foundations with recent research results, current technology, and best practices.

- COMP 271: Data Structures and Applications
  github.com/luccs271course

- COMP 313/413: Intermediate Object-Oriented Programming,
  lucoodevcourse.github.io

- COMP 371/471: Theory of Programming Languages,
  lucproglangcourse.github.io

I have also supervised student research through the following courses. Further information on the results of this work is provided below.

- COMP 398: Independent Study

- COMP 490: Programming Project

New Courses Prepared at Loyola

Since joining the faculty of Loyola University Chicago in 1992, I have developed, co-developed, or re-developed (significantly updated) the following courses.

COMP 101 Exploring the Internet
   This course is designed to provide students with their first internet experience. Co-developed this course and added it to undergraduate curriculum in 1996.

COMP 170 Structured Programming
   Redeveloped this course to use the C++ language in 1995.

COMP 271 Data Abstraction and Object-Oriented Programming
   Redeveloped this course to include material on testing and performance in spring 2009.

COMP 272 Data Abstraction and Object-Oriented Programming
   Developed this intermediate-level course as the missing link between the introductory sequence and the advanced courses. Added the course to the undergraduate curriculum in 1994.

COMP 330 Software Engineering
   Developed this missing undergraduate-level software engineering course and added it to undergraduate curriculum in 1993.

COMP 313/413 Intermediate Object-Oriented Programming
Reintroduced this intermediate-level course as a replacement for COMP 272, the missing link between the introductory sequence and the advanced courses. Added the course to the undergraduate curriculum in 2007. Updated the course in fall 2011 to use the C# language, include more engaging projects, and cover concurrency. Redeveloped it again for fall 2012 to cover design principles and patterns, along with mobile application development projects targeting Android.

COMP 324/424 Client-Side Web Development
Developed this course and added it to the curriculum in 2007. This course provides an in-depth study of the concepts and methods required for the design and implementation of the presentation layer of a web 2.0 application, with a focus on client-side execution mechanisms such as JavaScript.

COMP 333/433 Web Services Programming,
Developed and offered this course in 2008. This course provides an in-depth study of web services in both process- and resource-oriented (RESTful) forms.

COMP 337/437 Introduction to Concurrency
Co-developed this course and added it to the curriculum in 1997. This course addresses the need to teach students concurrency, which is ubiquitous in modern software systems. Furthermore, the course has given me an opportunity to incorporate recent research results from the NSF-funded Triveni project on frameworks for concurrent programming into my teaching.

COMP 338/442 Server-Side Software Development (formerly Interactive Services Programming)
Co-developed this course and added it to the curriculum in 2000. This course teaches server-side application development, the technology underlying e-commerce applications and other server-based systems. Furthermore, this course has allowed me to expose students to the work on Sisl, which I conducted while a consultant at Lucent Technologies. The course includes a semester-long group project, where students develop a web-based issue tracking system, an auction/e-commerce system, or a homework submission/grading system.

COMP 371/471 Theory of Programming Languages,
Redeveloped this course from ground up in fall 2010 to use the F# and Haskell language and include modern material on advanced functional programming and concurrency.

COMP 373/473 Advanced Object-Oriented Development
Developed the initial version of this course upon joining Loyola in 1992. This course studies software development using the object-oriented methodology, in particular, object-oriented software design patterns, which describe recurring solutions to common problems encountered during development. The current version of the course has been significantly enhanced to include material on Test-Driven Development, Aspect-Oriented Programming (AOP), and other insights from my 2001 full-time industry leave as a software architect.

Curricular Development

- My recent curriculum development efforts in concurrent and distributed programming have contributed to the following outcomes.

- K. Läufer, John O'Sullivan, and G. K. Thiruvathukal. Tests as Maintainable Assets Via Auto-generated Spies: A case study involving the Scala collections library's Iterator trait, In *Proc. 10th ACM Scala Symposium (Scala '19)*, London, UK, Jul. 2019, doi:10.1145/3337932. 3338814.
- K. Läufer and G. K. Thiruvathukal. Managing Concurrency in Mobile User Interfaces with Examples in Android. In Prasad, Gupta, Rosenberg, Sussman, and Weems (editors), *Topics in Parallel and Distributed Computing: Introducing Concurrency in Undergraduate Courses, Volume 2,* Springer Verlag, 2018, doi:10.1007/978-3-319-93109-8_9.
- K Läufer, GK Thiruvathukal, and MC Lewis. *Experiences with Scala Across the College-Level Curriculum.* Invited talk, Scala Days, Chicago, 2017.
- WL Honig, K Läufer, GK Thiruvathukal. A framework architecture for student learning in distributed embedded systems. In *Proc. 10th IEEE International Symposium on Industrial Embedded Systems (SIES),* 2015.
- K. Läufer, C. Sekharan, and G. K. Thiruvathukal. *NVIDIA equipment award for Early Adopters* under the NSF/IEEE-TCPP Curriculum Initiative on Parallel and Distributed Computing, January 2012.
- K. Läufer, C. N. Sekharan, and G. K. Thiruvathukal. PDC Modules for Every Level: A Comprehensive Model for Incorporating PDC Topics into the Existing Undergraduate Curriculum. In *Proc. 1st NSF/IEEE-CS TCPP Workshop on Parallel and Distributed Computing Education (EduPar),* Anchorage, Alaska, May 2011.

- I continue to be passionate about the opportunity to integrate my current research into the curriculum. The various advanced undergraduate and graduate courses mentioned above serve as examples of this approach.

- I have established the *Extreme Software Development Series*, a coherent set of challenging, state-of-the-art 300- and 400-level elective courses on the development of interactive GUI-based, web-based, mobile, and other distributed applications. The *Extreme Series* has shown to be quite popular with upper-division undergraduate students and graduate students alike. It includes the above-mentioned Comp 337/437 and 338/442 courses.

- I have developed effective instructional materials for my courses, including working example programs and starting points for programming projects given in these courses. Using tools such as Eclipse, a very successful free, open-source integrated development environment (IDE), in conjunction with CVS, a widely used version control system, and Maven, a state-of-the-art project management system, students are immersed in an environment that resembles real-world software development practice.

Other Pedagogical Activities

- I have been active in the area of computer science education since the mid-nineties. My contributions in this area are described in Section 2 and include extramural funding, publications, sharing of course materials, participation in educational workshops, and work in progress.

- The following publications and workshop presentations, also listed in Section 2, are the result of the involvement of undergraduate and graduate students in my ongoing research by enrolling in the above-mentioned COMP 398, COMP 490, and COMP 499 courses. Student co-authors are listed in boldface.

– K. Läufer, **J. O'Sullivan**, and G. K. Thiruvathukal. *Auto-generated Spies Increase Test Maintainability.* arXiv preprint, 2018.

– **S Reisman**, **T Hatzopoulos**, K Läufer, GK Thiruvathukal, C Putonti. A Polyglot Approach to Bioinformatics Data Integration: A Phylogenetic Analysis of HIV-1. *Evolutionary Bioinformatics* 12, EBO, 2016.

– GK Thiruvathukal, **S Shilpika**, NJ Hayward, **S Aguiar**, K Läufer. Towards Sustainable Digital Humanities Software. Position paper at the *Workshop on Sustainable Software for Science: Practice and Experiences (WSSSPE)*, 2015.

– **B. Gathright**, K. Läufer, **A. Parsa**, and G. K. Thiruvathukal. Middleware for Collaborative Distributed/Mobile Applications: XMPP or Reactive HTTP? (Poster). To appear in *Proc. 4th Greater Chicago Area System Research Workshop (GCASR)*, Chicago, Illinois, April 2015.

– **S. Reisman**, C. Putonti, G. K. Thiruvathukal, K. Läufer. A Polyglot Approach to Bioinformatics Data Integration: Phylogenetic Analysis of HIV-1. In *Proc. 2nd Greater Chicago Area System Research Workshop (GCASR)*, Evanston, Illinois, May 2013.

– **P. Stasiuk**, K. Läufer, and G. K. Thiruvathukal. Network Technologies used to Aggregate Environmental Data (Poster). In *Proc. 2nd Greater Chicago Area System Research Workshop (GCASR)*, Evanston, Illinois, May 2013.

– **T. Delgado Dias**, **X. Yan**, K. Läufer, and G. K. Thiruvathukal. Building Capable, Energy-Efficient, Flexible Visualization and Sensing Clusters from Commodity Tablets (Poster). In *Proc. 2nd Greater Chicago Area System Research Workshop (GCASR)*, Evanston, Illinois, May 2013.

– **J. P. Kaylor**, K. Läufer, G. K. Thiruvathukal. Simplifying Domain Modeling and Memory Management in User-Mode Filesystems with the NOFS Framework. In *Proc. IEEE Intl. Conf. on Electro/Information Technology (EIT)*, May 2012.

– **J. P. Kaylor**, K. Läufer, and G. K. Thiruvathukal, RestFS: The Filesystem as a Connector Abstraction for Flexible Resource and Service Composition. In *Cloud Computing: Methodology, Systems, and Applications*, L. Wang et al., editors. Boca Raton, Florida, USA: CRC Press, Sep. 2011.

– **J. P. Kaylor**, K. Läufer, and G. K. Thiruvathukal. REST on routers? preliminary lessons for language designers, framework architects, and app developers. In *Proc. 6th International Conference on Software and Data Technologies (ICSOFT)*, Sevilla, Spain, July 2011. INSTICC.

– **J. P. Kaylor**, K. Läufer, and G. K. Thiruvathukal. RestFS: Resources and Services are Filesystems, Too. In *Proc. 2nd ACM International Workshop on RESTful Design at WWW 2011 (WS-REST)*, Hyderabad, India, March 2011.

– G. K. Thiruvathukal, K. Hinsen, K. Läufer, and **J. Kaylor**. Virtualization for Computational Scientists. *IEEE Computing in Science & Engineering*, 12(4), 2010.

– **J. P. Kaylor**, K. Läufer and G. K. Thiruvathukal. *Naked Object File System (NOFS): A Framework to Expose an Object-Oriented Domain Model as a File System*. Loyola University Chicago, Technical Report, May 2010.

– **J. Kaylor**, K. Läufer and G. K. Thiruvathukal. Online Layered File System (OLFS): A Layered and Versioned Filesystem and Performance Analysis. In *Proc. IEEE Intl. Conf. on Electro/Information Technology (EIT)*, May 2010.

– K. Läufer, G. K. Thiruvathukal, **R. Nishimura**, and **C. Ramírez Martínez-Eiroa**. Putting a Slug to Work. *IEEE Computing in Science & Engineering,* 11(2), 2009.

– **S. Herr**, **J. Shafaee**, K. Läufer, G. K. Thiruvathukal, and G. Wirtz. Combining SOA and BPM technologies for cross-system process automation. In *Proc. 20th Intl. Conf. on Software Engineering and Knowledge Engineering (SEKE)*, July 2008.

– **M. Bone**, **P. Nabicht**, K. Läufer, and G. K. Thiruvathukal. Taming XML: objects first, then markup. In *Proc. IEEE Intl. Conf. on Electro/Information Technology (EIT)*, May 2008.

– **N. Mehta**, **Y. Kanitkar**, K. Läufer, and G. K. Thiruvathukal. A Model-Driven Approach to Job/Task Composition in Cluster Computing. In *Proc. 9th International Workshop on Java and Components for Parallelism, Distribution and Concurrency*, March 2007.

– K. Läufer, G. K. Thiruvathukal, and **B. González**. A hike through post-EJB J2EE web application architecture, part III. *IEEE Computing in Science & Engineering,* 9(1):82–95, 2007.

– **N. Mehta**, **Y. Kanitkar**, K. Läufer, and G. K. Thiruvathukal. A model-driven approach to job/task composition in cluster computing. *Proc. 2004 Midwest Software Engineering Conference (MSEC),* Chicago, Illinois, USA, April 2004.

– **S. Ahmed**, **I. Fatima**, **T. Joseph**, **Y. Kanitkar**, K. Läufer, **N. Mehta**, **B. Slusarek**, and G. K. Thiruvathukal. The Loyola Concurrent, Parallel, and Distributed Computing Group (Poster and Tool Demo). In *Proc. 2004 Midwest Software Engineering Conference (MSEC)*, Chicago, Illinois, USA, April 2004.

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– K. Läufer and **S. Ladha**. TriveniLite: A framework for defining and composing tasks in concurrent applications. Presented at the *Fall Meeting of the Midwest Society for Programming Languages and Systems/Midwest SIGPLAN*, Robert Morris College, Chicago, November 2002.

– V. Gupta, L. J. Jagadeesan, R. Jagadeesan, **X. Jiang**, and K. Läufer. *A Constraint- Based Framework for Prototyping Distributed Virtual Applications.* In Proc. Principles and Practice of Constraint Programming (PPCP 2000), Singapore, September 2000.

- I developed and held the following short courses for professionals:

  – *Java for C++ Programmers*, one day, off-site, August 1997.
  – *Java—Building Interactive Applications for the Web*, two days, June 1997, June 1998.
  – *Designing and Managing a World Wide Web Site*, two days, May and September 1997, May 1998.
  – *Java—Programming for the Internet*, two days, May and November 1996.
  – *Advanced Business Applications of The World Wide Web*, one day, November 1995, June and November 1996.
  – *The World Wide Web as a Business Resource*, one day, November 1995, June and November 1996.
  – *The Internet as a Business Resource*, two days, May 1995.

Advising

I have been involved in the following advising activities:

Undergraduate and graduate advising I have participated in undergraduate and graduate advising since these responsibilities were divided among all computer science faculty in 2000 for undergraduates and 1999 for graduates. I have made it a point to be highly available to my advisees in person, by phone, and through suitable electronic channels. I am also happy to counsel other students who approach me for advice.

Employment reference I regularly serve as a reference in support of our students' applications for employment in a variety of settings, including private companies, educational organizations, other nonprofit organizations, government agencies, etc.

Reference for applications to graduate and professional programs I frequently serve as a reference in support of our students' applications for graduate or professional studies, including MBA programs, Law School, and Medical School.