

## John F. Pane

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### Research Interests

Experimental and quasi-experimental methods for evaluating causal effects of educational interventions and policies, personalized learning, education technology, data driven decision-making in education, math and science education, human-computer interaction, computer interface design, and the effects of technology on individuals and organizations.

### Education

Ph.D., Computer Science, Carnegie Mellon University, Pittsburgh, PA, USA, 2002.

Advisors: Brad Myers and David Garlan

Thesis: *A Programming System for Children that is Designed for Usability*

M.S., Computer Science, Carnegie Mellon University, Pittsburgh, PA, USA, 1994.

B.S., Electrical and Computer Engineering and Mathematics, Carnegie Mellon University, Pittsburgh, PA, USA, 1985.

### Professional Experience

RAND Corporation, Pittsburgh, PA, USA, 2002 – present.

Senior Scientist and Professor, Pardee RAND Graduate School. Principal investigator on projects employing rigorous causal methods and researching personalized learning, education technology, summer learning, math and science education reform efforts, and data driven decision-making in education.

Education research and evaluation consultant, 2006 – 2007.

Western Pennsylvania Educational Leadership Initiative.

Carnegie Mellon University, Pittsburgh, PA, USA, 1985 – 1991, 1992 – 1995.

Project Scientist, Project Supervisor, Research Programmer.

Researched, designed and evaluated educational software systems.

Biological Detection Systems, Inc., Pittsburgh, PA, USA, 1991 – 1992.

Senior Software Engineer.

Software development and user interface consultant, 1986 – 1999.

Clients include: Texas Instruments, Pratt Institute, Perceptics Corporation, City University of New York, and University of Pittsburgh.

### Publications

#### *Peer Reviewed Journal Articles*

Sales, A. C., & **Pane, J. F.** (2018). The Role of Mastery Learning in an Intelligent Tutoring System: Principal Stratification on a Latent Variable. *Annals of Applied Statistics, to appear*, arXiv:1707.09308.

Bingham, A. J., **Pane, J. F.**, Steiner, E. D., & Hamilton, L. S. (2018). Ahead of the Curve: Implementation Challenges in Personalized Learning School Models. *Educational Policy, 32*(3), 454-489.

doi:10.1177/0895904816637688

Karam, R., **Pane, J. F.**, Griffin, B. A., Robyn, A., Phillips, A., & Daugherty, L. (2017). Examining the implementation of technology-based blended algebra I curriculum at scale. *Educational Technology Research and Development*, 65, 399-425. doi:10.1007/s11423-016-9498-6

Schweig, J. D., & **Pane, J. F.** (2016). Intention-to-treat analysis in partially nested randomized controlled trials with real-world complexity. *International Journal of Research & Method in Education*, 39(3), 268-286. doi:10.1080/1743727X.2016.1170800

**Pane, J. F.**, Griffin, B. A., McCaffrey, D. F., & Karam, R. (2014). Effectiveness of Cognitive Tutor Algebra I at Scale. *Educational Evaluation and Policy Analysis*, 36(2), 127-144. doi: 10.3102/0162373713507480

Kaufman, J. H., Karam, R., **Pane, J. F.**, & Junker, B. W. (2012). How Curriculum and Classroom Achievement Predict Teacher Time on Lecture- and Inquiry-based Mathematics Activities. *Journal of Mathematics Education at Teachers College*, 3(2), 56-62.

Springer, M. G., **Pane, J. F.**, Le, V.-N., McCaffrey, D. F., Burns, S., Hamilton, L. S., & Stecher, B. (2012). Team Pay for Performance: Experimental Evidence from the Round Rock Pilot Project on Team Incentives. *Educational Evaluation and Policy Analysis*, 34(4), 367-390. doi: 10.3102/0162373712439094

**Pane, J. F.**, McCaffrey, D. F., Slaughter, M. E., Steele, J. L., & Ikemoto, G. S. (2010). An Experiment to Evaluate the Efficacy of Cognitive Tutor Geometry. *Journal of Research on Educational Effectiveness*, 3(3), 254-281. <http://www.informaworld.com/smpp/content~db=all~content=a923173727>

Straus, S. G., Bikson, T. K., Balkovich, E., & **Pane, J. F.** (2010). Mobile Technology and Action Teams: Assessing BlackBerry Use in Law Enforcement Units. *Computer Supported Cooperative Work*, 19(1), 45-71. <http://www.springerlink.com/content/t85772wr73442340/>

**Pane, J. F.**, McCaffrey, D. F., Kalra, N., & Zhou, A. J. (2008). Effects of Student Displacement in Louisiana During the First Academic Year After the Hurricanes of 2005. *Journal of Education for Students Placed at Risk*, 13(2-3), 168-211. <http://www.informaworld.com/smpp/content~db=all~content=a903273563>

Ward, M. E., Shelley, K., Kaase, K., & **Pane, J. F.** (2008). Hurricane Katrina: A Longitudinal Study of the Achievement and Behavior of Displaced Students. *Journal of Education for Students Placed at Risk*, 13, 297-317. <http://www.informaworld.com/smpp/content~db=all~content=a903272873>

Myers, B. A., **Pane, J. F.**, & Ko, A. (2004). Natural Programming Languages and Environments. *Communications of the ACM*, 47(9), 47-52. <http://doi.acm.org/10.1145/1015864.1015888>

**Pane, J. F.**, Ratanamahatana, C. A., & Myers, B. A. (2001). Studying the Language and Structure in Non-Programmers' Solutions to Programming Problems. *International Journal of Human-Computer Studies*, 54(2), 237-264. <http://www.cs.cmu.edu/~pane/IJHCS.html>

Miller, P., **Pane, J.**, Meter, G., & Vorthmann, S. (1994). Evolution of Novice Programming Environments: The Structure Editors of Carnegie Mellon University. *Interactive Learning Environments*, 4(2), 140-158. <http://www.cs.cmu.edu/~pane/ile.html>

#### *Peer Reviewed RAND Publications*

**Pane, J. F.** (2018). *Strategies for Implementing Personalized Learning While Evidence and Resources Are Underdeveloped*. Santa Monica, CA: RAND Corporation. <http://rand.org/t/PE314>

Best, K. L., & **Pane, J. F.** (2018). *Privacy and Interoperability Challenges Could Limit the Benefits of Education Technology*. Santa Monica, CA: RAND Corporation. <http://rand.org/t/PE313>

Phillips, A., **Pane, J. F.**, & Bogart, A. (2018). *Evaluation of the Creating College and Career Readiness Initiative in Kentucky* (RR-2745-KVEC). Santa Monica, CA: RAND Corporation. <http://rand.org/t/RR2745>

**Pane, J. F.**, Steiner, E. D., Baird, M. D., Hamilton, L. S., & Pane, J. D. (2017). *Informing Progress: Insights on Personalized Learning Implementation and Effects*. Santa Monica, CA: RAND Corporation. <http://rand.org/t/RR2042>

Augustine, C. H., McCombs, J. S., **Pane, J. F.**, Schwartz, H. L., Schweig, J., McEachin, A., & Siler-Evans, K. (2016). *Learning from Summer: Effects of Voluntary Summer Learning Programs on Low-Income Urban Youth*. Santa Monica, CA: RAND Corporation. <http://www.rand.org/t/RR1557>

**Pane, J. F.**, Steiner, E. D., Baird, M. D., & Hamilton, L. S. (2015). *Continued Progress: Promising Evidence on Personalized Learning*. Santa Monica, CA: RAND Corporation. <http://rand.org/t/RR1365>

McCombs, J. S., **Pane, J. F.**, Augustine, C. H., Schwartz, H. L., Martorell, P., & Zakaras, L. (2014). *Ready for Fall? Near-Term Effects of Voluntary Summer Learning Programs on Low-Income Students' Learning Opportunities and Outcomes*. Santa Monica, CA: RAND Corporation. <http://www.rand.org/t/RR815>

Daugherty, L., Phillips, A., **Pane, J. F.**, & Karam, R. (2012). *Analysis of Costs in an Algebra I Curriculum Effectiveness Study*. Santa Monica, CA: RAND Corporation. <http://www.rand.org/t/TR1171-1>

**Pane, J. F.**, Williams, V. L., Olmsted, S. S., Yuan, K., Spindler, E., & Slaughter, M. E. (2009). *Math Science Partnership of Southwest Pennsylvania: Measuring Progress Towards Goals*. Santa Monica, CA: RAND Corporation. <http://www.rand.org/t/MG857>

**Pane, J. F.**, McCaffrey, D. F., Tharp-Taylor, S., Asmus, G. J., & Stokes, B. R. (2006). *Student Displacement in Louisiana After the Hurricanes of 2005: Experiences of Public Schools and Their Students*. Santa Monica, CA: RAND. <http://www.rand.org/t/TR430>

Marsh, J. A., **Pane, J. F.**, & Hamilton, L. S. (2006). *Making Sense of Data-Driven Decision Making: Evidence from Recent RAND Research*. Santa Monica, CA: RAND Corporation. <http://www.rand.org/t/OP170>

Kerr, K. A., **Pane, J. F.**, & Barney, H. (2003). *Quaker Valley Digital School District: Early Effects and Plans for Future Evaluation*. Santa Monica, CA: RAND Corporation. <http://www.rand.org/t/TR107>

**Pane, J. F.**, & Joe, L. (2004). *Making Better Use of Bandwidth: Data Compression and Network Management Technologies*. Santa Monica, CA: RAND Corporation. <http://www.rand.org/t/TR216>

#### Conference Presentations

Baird, M., & **Pane, J. F.** (2018). *Translating Standardized Education Program Effects into More Interpretable Metrics*. Paper presented at the SREE Spring 2018 Conference, Society for Research on Educational Effectiveness, Washington, DC.

Sales, A. C., & **Pane, J. F.** (2018). *Theory Vs. Practice of Mastery Learning in the Cognitive Tutor: Principal Stratification on a Latent Variable*. Paper presented at the SREE Spring 2018 Conference, Society for Research on Educational Effectiveness, Washington, DC.

**Pane, J. F.**, & Steiner, E. D. (2017, November 7). *Personalized Learning: Insights on Effects and Implementation*. Presented at TRETTC Three Rivers Education Technology Conference McKees Rocks, PA.

**Pane, J. F.**, & Steiner, E. D. (2017, October 23-25). *Personalized Learning: Insights on Effects and Implementation*. Presented at iNACOL Symposium 2017, Orlando, FL.

**Pane, J. F.**, Steiner, E. D., & McCann, C. (2017, September 7-8). *Relating RTT-D's Work to Broader Research on Personalized Learning*. Presented at 2017 Personalized Learning Summit: A Lasting Legacy: What's Next in Personalized Learning?, Washington, DC.

- Sales, A. C., Wilks, A., & **Pane, J. F.** (2016, June 29 - July 2). *Student Usage Predicts Treatment Effect Heterogeneity in the Cognitive Tutor Algebra I Program*. Proceedings of the 9th International Conference on Educational Data Mining (EDM), Raleigh, NC, 207-214.
- Sales, A. C., & **Pane, J. F.** (2016). *Modeling the Treatment Effect from Educational Technology as a Function of Student Usage*. Paper presented at the 41st Annual Conference of the Association for Education Finance and Policy, Denver, CO.
- Baird, M., & **Pane, J. F.** (2016). *Dealing with Variation in Test Conditions When Estimating Program Effects*. Paper presented at the 41st Annual Conference of the Association for Education Finance and Policy, Denver, CO.
- Sales, A. C., & **Pane, J. F.** (2015, June 26-29). *Exploring Causal Mechanisms in a Randomized Effectiveness Trial of the Cognitive Tutor*. Proceedings of the 8th International Conference on Educational Data Mining (EDM), Madrid, Spain, 504-507.
- Schweig, J., & **Pane, J. F.** (2015). *Partially Nested Randomized Control Trials in Educational Research: Applications to a Summer Learning Program*. Paper presented at the Modern Modeling Methods (M3) Conference: 2015, Storrs, CT.
- Augustine, C. H., McCombs, J. S., **Pane, J.**, & Schwartz, H. L. (2015). *Findings From a Randomized Controlled Trial on Five Voluntary Summer Learning Programs Across the Country*. Paper presented at the Annual Meeting of the American Educational Research Association, Chicago, IL.
- Pane, J. F.**, Hamilton, L. S., & Steiner, E. D. (2015). *Personalized Learning: Implementation Details and Effects on Student Achievement*. Paper presented at the Association for Education Finance and Policy 40th Annual Conference, Washington D.C.
- McCombs, J., Augustine, C., **Pane, J.**, & Schwartz, H. (2015). *Early Effects of Voluntary Academic and Enrichment Summer Programs on Low-Income Students' Learning Opportunities and Outcomes: Findings from a Five-District Randomized Controlled Trial*. Paper presented at the Association for Education Finance and Policy 40th Annual Conference, Washington D.C.
- Benson, S., Bernatek, B., & **Pane, J.** (2015). *Research Findings on Schools that are Pursuing Personalized Learning*. Paper presented at the iNACOL Blended and Online Learning Symposium, Palm Springs, CA.
- Pane, J. F.**, Griffin, B. A., McCaffrey, D. F., & Karam, R. (2013). *Effectiveness of Cognitive Tutor Algebra I at Scale*. Paper presented at the SREE Spring 2013 Conference, Society for Research on Educational Effectiveness, Washington, DC.
- Karam, R., **Pane, J. F.**, & Griffin, B. A. (2013). *Examining the Implementation of the Cognitive Tutor Algebra I (CTAI) Curriculum in Middle and High Schools*. Paper presented at the SREE Spring 2013 Conference, Society for Research on Educational Effectiveness, Washington, DC.
- Ikemoto, G. S., Steele, J. L., **Pane, J. F.**, & Lichter, D. (2012). *Implementation Study Results of an Efficacy Trial of the Cognitive Tutor Geometry Curriculum*. Paper presented at the Achieving Success at Scale: Research on Effective High Schools, Nashville, TN.
- Kaufman, J. H., Karam, R. T., & **Pane, J. F.** (2012). *The Role of Reform-Oriented Mathematics Curriculum in More Equitable Instruction*. Paper presented at the Annual Meeting of the American Educational Research Association, Vancouver, Canada.
- McCaffrey, D. F., Lockwood, J. R., Griffin, B. A., Setodji, C. M., & **Pane, J. F.** (2012). *Correcting for Broken Randomization Using Error-Prone Achievement Test Scores in Propensity Score Weighting*. Paper presented at the SREE Fall 2012 Conference, Society for Research on Educational Effectiveness, Washington, DC.

Kaufman, J. H., Karam, R., **Pane, J. F.**, & Junker, B. (2012). *How curriculum and students' algebra readiness influence time teachers spend on traditional and reform-oriented mathematics activities*. Paper presented at the SREE Fall 2012 Conference, Society for Research on Educational Effectiveness, Washington, DC.

**Pane, J. F.**, Griffin, B. A., McCaffrey, D. F., & Karam, R. (2011). *The Challenge of Authenticity in Scale-Up Effectiveness Trials*. Paper presented at the SREE Fall 2011 Conference, Society for Research on Educational Effectiveness, Washington, DC.

McCaffrey, D. F., **Pane, J. F.**, Springer, M. G., Burns, S., & Haas, A. (2011). *Team Pay for Performance: Experimental Evidence from Round Rock's Project on Incentives in Teaching*. Paper presented at the Spring 2011 Conference of the Society for Research on Educational Effectiveness, Washington, DC.

Karam, R., **Pane, J.**, Griffin, B. A., Daugherty, L., Robyn, A., Ikemoto-Schuyler, G., & Waite, A. (2009). *Examining the Implementation of the Cognitive Tutor Algebra 1 Curriculum in Middle and High Schools*. Paper presented at the Annual Meeting of the American Educational Research Association, San Diego, CA.

**Pane, J. F.**, McCaffrey, D. F., Ikemoto, G. S., Steele, J. L., & Slaughter, M. E. (2009). *Results from a Randomized Efficacy Trial of Cognitive Tutor Geometry*. Paper presented at the Second Annual Conference of the Society for Research on Educational Effectiveness, Washington, DC.

McCaffrey, D. F., **Pane, J. F.**, Slaughter, M. E., Lockwood, J. R., & Springer, M. G. (2009). *Examples of Blocking in Multilevel Experiments*. Paper presented at the Second Annual Conference of the Society for Research on Educational Effectiveness, Washington, DC.

Griffin, B. A., McCaffrey, D. F., & **Pane, J. F.** (2009). *Evaluating the Use of Blocking in Cluster Randomized Control Trials*. Paper presented at the Second Annual Conference of the Society for Research on Educational Effectiveness, Washington, DC.

Ward, M. E., Shelley, K., Kaase, K., & **Pane, J. F.** (2008). *Hurricane Katrina and Displaced Students: Achievement and Behavior in the Wake of the Storm*. Paper presented at the Annual Meeting of the American Educational Research Association, New York.

**Pane, J. F.**, & McCaffrey, D. F. (2007). *Effects of Student Displacement on Schools and Students in Louisiana*. Paper presented at the Annual Meeting of the American Educational Research Association, Chicago, IL.

**Pane, J. F.** (2006). *Data Driven Decisionmaking in Southwestern Pennsylvania School Districts*. Paper presented at the Annual Meeting of the National Council on Measurement in Education, San Francisco, CA.

**Pane, J. F.**, Myers, B. A., & Miller, L. B. (2002). Using HCI Techniques to Design a More Usable Programming System *Proceedings of IEEE 2002 Symposia on Human Centric Computing Languages and Environments (HCC 2002)* (pp. 198-206). Arlington, VA: IEEE Computer Society. <http://www.cs.cmu.edu/~pane/HCC2002.html>

**Pane, J. F.**, & Myers, B. A. (2000). Tabular and Textual Methods for Selecting Objects from a Group *Proceedings of VL 2000: IEEE International Symposium on Visual Languages* (pp. 157-164). Seattle, WA: IEEE Computer Society. <http://www.cs.cmu.edu/~pane/VL2000.html>

**Pane, J. F.**, Corbett, A. T., & John, B. E. (1996). Assessing Dynamics in Computer-Based Instruction *Proceedings of ACM CHI 96 Conference on Human Factors in Computing Systems* (pp. 197-204). Vancouver, BC, Canada. <http://www.cs.cmu.edu/~acse/chi96.html>

Roberts, J., **Pane, J.**, Stehlik, M., & Carrasquel, J. (1988). The Design View: A Design Oriented, High-Level Visual Programming Environment *Proceedings of the 1988 IEEE Workshop on Visual Languages* (pp. 213-220). Pittsburgh, PA.

McKeown, D. M., & **Pane, J. F.** (1985). Alignment and Connection of Fragmented Linear Features in Aerial Imagery *Proceedings of the 1985 IEEE Conference on Computer Vision and Pattern Recognition* (pp. 55-61). San Francisco, CA.

**Pane, J. F.**, & Myers, B. A. (2002). The Impact of Human-Centered Features on the Usability of a Programming System for Children *CHI 2002 Extended Abstracts: Conference on Human Factors in Computing Systems* (pp. 684-685). Minneapolis, MN: ACM Press.  
<http://www.cs.cmu.edu/~pane/CHI2002.html>

**Pane, J. F.** (2001, September 5-7). *Human-Centered Design of a Programming System for Children*. Paper presented at the Children's Programming Odyssey Workshop, HCC 2001 IEEE Symposia on Human-Centric Computing Languages and Environments, Stresa, Italy.  
<http://www.cs.cmu.edu/~pane/HCC2001.html>

**Pane, J. F.**, & Myers, B. A. (2000). Improving User Performance on Boolean Queries. In G. Szwillus & T. Turner (Eds.), *CHI 2000 Extended Abstracts: Conference on Human Factors in Computing Systems* (pp. 269-270). The Hague, Netherlands: ACM Press. <http://www.cs.cmu.edu/~pane/CHI2000.html>

**Pane, J. F.**, & Myers, B. A. (2000). The Influence of the Psychology of Programming on a Language Design: Project Status Report. In A. F. Blackwell & E. Bilotta (Eds.), *Proceedings of the 12th Annual Meeting of the Psychology of Programmers Interest Group* (pp. 193-205). Corigliano Calabro, Italy: Edizioni Memoria. <http://www.cs.cmu.edu/~pane/PoPInfluence.html>

**Pane, J. F.** (1998). Designing a Programming System for Children with a Focus on Usability *CHI 98 Summary: Conference on Human Factors in Computing Systems* (pp. 62-63). Los Angeles: ACM Press.  
<http://www.cs.cmu.edu/~pane/CHI98.html>

**Pane, J. F.** (1997, October 24). *A Programming System for Children that is Designed for Usability*. Paper presented at the 7th Workshop on Empirical Studies of Programmers: Graduate Student Workshop, Alexandria, VA. <http://www.cs.cmu.edu/~pane/ESPGradWorkshop.html>

Myers, B. A., Modugno, F., McDaniel, R., Kosbie, D., Werth, A., Miller, R. C., **Pane, J.**, Landay, J., Goldstein, J., & Goldberg, M. A. (1996, March 25-27). *The Demonstrational Interfaces Project at CMU*. Paper presented at the 1996 AAAI Spring Symposium on Acquisition, Learning and Demonstration: Automating Tasks for Users, Stanford, CA. <http://www.cs.cmu.edu/~pane/demonstrational.html>

Chuah, M. C., John, B. E., & **Pane, J.** (1994). Analyzing Graphic and Textual Layouts with GOMS: Results of a Preliminary Analysis *CHI 94 Conference Companion: Conference on Human Factors in Computing Systems* (Vol. 2, pp. 323-324). Boston, MA. <http://www.cs.cmu.edu/~pane/GOMS/>

**Pane, J. F.**, & Miller, P. L. (1993). The ACSE Multimedia Science Learning Environment. In T.-W. Chan (Ed.), *Proceedings of the 1993 International Conference on Computers in Education* (pp. 168-173). Taipei, Taiwan. <http://www.cs.cmu.edu/~acse/icce93.html>

**Pane, J. F.**, & Miller, P. L. (1993). The ACSE Multimedia Environment for Science Education 1993 *International Conference for Computer Technologies in Education*. Kiev, Ukraine.

Goldenson, D. R., Chandhok, R. P., Garlan, D. H., Meter, G., Miller, P. L., **Pane, J.**, . . . Skwarecki, E. J. (1992). GENIE: Developing and Assessing State-of-the-Art Integrated Programming Environments. *CHI 91 Formal Video Program: Conference on Human Factors in Computing Systems*, 24(2), 39-40.

Chandhok, R., Miller, P., **Pane, J.**, & Meter, G. (1990, April). *Structure Editing: Evolution Towards Appropriate Use*. Paper presented at the 1990 ACM SIGCHI Workshop on Structure Editors, Seattle, WA.

Carrasquel, J., Roberts, J., & **Pane, J.** (1989). The Design Tree: A Visual Approach to Top-Down Design and Data Flow *SIGCSE Bulletin: Twentieth SIGCSE Technical Symposium on Computer Science Education* (Vol. 21, pp. 17-21). Louisville, KY.

*Research Briefs, Infographics, Addenda, and Working Papers*

Baird, M. D., & **Pane, J. F.** (2018). *Translating Standardized Effects of Education Programs into More Interpretable Metrics*. Santa Monica, CA: RAND Corporation, WR-1226-BMGF.  
<http://www.rand.org/t/WR1226>

Baird, M. D., & **Pane, J. F.** (2018). *Controlling for Changes in Test Conditions when Estimating Education Intervention Effects*. Santa Monica, CA: RAND Corporation, WR-1245-BMGF.  
<http://www.rand.org/t/WR1245>

Sales, A. C., & **Pane, J. F.** (2018). Student Log-Data from a Randomized Evaluation of Educational Technology: A Causal Case Study. *e-print ArXiv, 1808.02528*. <https://arxiv.org/abs/1808.02528>

Israni, A., Sales, A. C., & **Pane, J. F.** (2018). Mastery Learning in Practice: A (Mostly) Descriptive Analysis of Log Data from the Cognitive Tutor Algebra I Effectiveness Trial. *ArXiv e-prints, 1802.08616*. <https://arxiv.org/abs/1802.08616>

**Pane, J. F.**, Steiner, E. D., Baird, M. D., Hamilton, L. S., & Pane, J. D. (2017). *How Does Personalized Learning Affect Student Achievement?* (RB-9994-BMGF). Retrieved from Santa Monica, CA:  
<http://www.rand.org/t/RB9994>

**Pane, J. F.**, Steiner, E. D., Baird, M. D., Hamilton, L. S., & Pane, J. D. (2017). *Observations and Guidance on Implementing Personalized Learning* (RB-9967-BMGF). Retrieved from Santa Monica, CA: RAND Corporation. <http://www.rand.org/t/RB9967>

**Pane, J. F.**, Steiner, E. D., Baird, M. D., Hamilton, L. S., & Pane, J. D. (2017). *Informing Progress: Personalized Learning Teacher and Student Survey Results*. Santa Monica, CA: RAND Corporation. [https://www.rand.org/content/dam/rand/pubs/research\\_reports/RR2000/RR2042/RAND\\_RR2042z1.pdf](https://www.rand.org/content/dam/rand/pubs/research_reports/RR2000/RR2042/RAND_RR2042z1.pdf)

Augustine, C. H., McCombs, J. S., **Pane, J. F.**, Schwartz, H. L., Schweig, J., McEachin, A., & Siler-Evans, K. (2016). *Study Suggests: Kids Who Attend More Thrive More*. Santa Monica, CA: RAND Corporation. <http://www.rand.org/t/IG127>

Augustine, C. H., McCombs, J. S., **Pane, J. F.**, Schwartz, H. L., Schweig, J., McEachin, A., & Siler-Evans, K. (2016). *Kids Who Attend More Benefit More: Voluntary Summer Learning Programs*. Santa Monica, CA: RAND Corporation. <http://www.rand.org/t/RB9924>

Steiner, E. D., Hamilton, L. S., Peet, E., & **Pane, J. F.** (2015). *Continued Progress: Promising Evidence on Personalized Learning: Survey Results Addendum*. Santa Monica, CA: RAND Corporation, RR-1365/2-BMGF. <http://rand.org/t/RR1365z2>

McCombs, J. S., **Pane, J. F.**, Augustine, C. H., Schwartz, H. L., Martorell, P., & Zakaras, L. (2014). *First Outcomes from the National Summer Learning Study*. Santa Monica, CA: RAND Corporation, RB-9819-WF. <http://www.rand.org/t/RB9819>

**Pane, J. F.**, & Baird, M. (2014). *Methods Used to Estimate Achievement Effects in Personalized Learning Schools*. Santa Monica, CA: RAND Corporation, WR-1061-BMGF.  
[http://www.rand.org/pubs/working\\_papers/WR1061](http://www.rand.org/pubs/working_papers/WR1061)

Siler-Evans, K., Steiner, E. D., Hamilton, L. S., & **Pane, J. F.** (2014). *Personalized Learning Instructional Staff Survey Results (Spring 2014)*. Santa Monica, CA: RAND Corporation, WR-1062-BMGF.  
[http://www.rand.org/pubs/working\\_papers/WR1062](http://www.rand.org/pubs/working_papers/WR1062)

**Pane, J. F.**, Griffin, B. A., McCaffrey, D. F., & Karam, R. (2014). *Addendum to Effectiveness of Cognitive Tutor Algebra I at Scale*. Santa Monica, CA: RAND Corporation, WR-1050-DEIES. [http://www.rand.org/pubs/working\\_papers/WR1050](http://www.rand.org/pubs/working_papers/WR1050)

**Pane, J. F.**, Griffin, B. A., McCaffrey, D. F., Karam, R., Daugherty, L. & Phillips, A. (2013). *Does an Algebra Course with Tutoring Software Improve Student Learning?* Santa Monica, CA: RAND Corporation, RB-9746-DEIES. <http://www.rand.org/t/RB9746>

Tananis, C. A., **Pane, J. F.**, Williams, V. L., Olmsted, S. S., Ciminillo, C., & Tharp-Taylor, S. (2007). *Math Science Partnership of Southwest Pennsylvania: Year Four Evaluation Report*. Santa Monica, CA: RAND, WR-494-AIU. [http://www.rand.org/pubs/working\\_papers/WR494](http://www.rand.org/pubs/working_papers/WR494)

Straus, S. G., Bikson, T. K., Balkovich, E., & **Pane, J. F.** (2007). *Mobile Technology and Action Teams: Assessing BlackBerry Use in Law Enforcement Units*. Santa Monica, CA: RAND Corporation, WR-458. [http://www.rand.org/pubs/working\\_papers/WR458](http://www.rand.org/pubs/working_papers/WR458)

**Pane, J. F.**, McCaffrey, D. F., Tharp-Taylor, S., Asmus, G. J., & Stokes, B. R. (2006). *How the 2005 Hurricanes Affected Students in Louisiana*. Santa Monica, CA: RAND Corporation, RB-9231-RC. <http://www.rand.org/t/RB9231>

Steele, J. L., **Pane, J. F.**, Williams, V. L., & Olmsted, S. S. (2006). *Professional Development Participation and the Role of Administrator Involvement in the Math Science Partnership of Southwest Pennsylvania*. Santa Monica, CA: RAND Corporation, WR-428-AIU. [http://www.rand.org/pubs/working\\_papers/WR428/](http://www.rand.org/pubs/working_papers/WR428/)

Williams, V. L., **Pane, J. F.**, Tananis, C. A., Olmsted, S. S., & Ciminillo, C. (2006). *Math Science Partnership of Southwest Pennsylvania: Year Three Evaluation Report*. Santa Monica, CA: RAND, WR-396-AIU. <http://www.rand.org/publications/WR/WR396>

Dembosky, J. W., **Pane, J. F.**, Barney, H., & Christina, R. (2005). *Data Driven Decisionmaking in Southwestern Pennsylvania School Districts*. Santa Monica, CA: RAND Corporation, WR-326-HE/GF. <http://www.rand.org/publications/WR/WR326>

Williams, V. L., **Pane, J. F.**, Tananis, C. A., & Olmsted, S. S. (2005). *Math Science Partnership of Southwest Pennsylvania: Year Two Evaluation Report*. Santa Monica, CA: RAND, WR-270-EDU. <http://www.rand.org/publications/WR/WR270>

#### *Non-refereed Technical Reports*

**Pane, J. F.** (2002). *A Programming System for Children that is Designed for Usability*. Ph.D. Thesis, Carnegie Mellon University, Pittsburgh, PA. <http://www.cs.cmu.edu/~pane/thesis/>

**Pane, J. F.**, & Myers, B. A. (1996). *Usability Issues in the Design of Novice Programming Systems*. Pittsburgh, PA: Carnegie Mellon University. <http://www.cs.cmu.edu/~pane/cmu-cs-96-132.html>

**Pane, J. F.** (1994). *Assessment of the ACSE Science Learning Environment and the Impact of Movies and Simulations*. Pittsburgh, PA: Carnegie Mellon University. <http://www.cs.cmu.edu/~acse/cmu-cs-94-162.html>

McKeown, D. M., & **Pane, J. F.** (1985). *Alignment and Connection of Fragmented Linear Features in Aerial Imagery*. Pittsburgh, PA: Carnegie Mellon University.

#### *Refereed Book Chapters*

Ikemoto, G. S., Steele, J. L., & **Pane, J. F.** (2016). Poor Implementation of Learner-Centered Practices: A Cautionary Tale. *Teachers College Record* (Yearbook), 118(13), 1-34.



**Pane, J. F.**, & Myers, B. A. (2006). More Natural Programming Languages and Environments. In H. Lieberman, F. Paterno & V. Wulf (Eds.), *End User Development* (Vol. 9, pp. 31-50). Dordrecht, The Netherlands: Springer.

Farkas, D. L., Baxter, G., DeBasio, R. L., Gough, A., Nederlof, M. A., Pane, D., **Pane, J.**, Patek, D. R., Ryan, K. W., & Taylor, D. L. (1993). Multimode Light Microscopy and the Dynamics of Molecules, Cells, and Tissues. In J. F. Hoffman (Ed.), *Annual Review of Physiology* (Vol. 55, pp. 785-817). Palo Alto, CA: Annual Review Inc.

### *Opinion Pieces*

**Pane, J. F.** (2017). What Emerging Research Says About the Promise of Personalized Learning. Commentary on the *Brookings Brown Center Chalkboard*. <https://www.brookings.edu/blog/brown-center-chalkboard/2017/08/15/what-emerging-research-says-about-the-promise-of-personalized-learning/>

**Pane, J. F.**, & Hamilton, L. S. (2016). Keeping Pittsburgh Out Front: Research Can Help Southwestern Pennsylvania Stay on the Cutting Edge of Education Innovation. *Pittsburgh Post-Gazette*. <http://www.post-gazette.com/opinion/Op-Ed/2016/05/08/Keeping-Pittsburgh-out-front/stories/201605080020>

**Pane, J. F.**, & Hamilton, L. S. (2016). Technology Is Only Part of Personalized Learning. Commentary on the *RAND Blog*. <http://www.rand.org/blog/2016/03/technology-is-only-part-of-personalized-learning.html>

**Pane, J. F.** (2015). Making Room for New Approaches: Recommendations for ESEA Reauthorization That Support Innovation. Commentary on the *RAND Blog*. <http://www.rand.org/blog/2015/01/making-room-for-new-approaches-recommendations-for.html>

**Pane, J. F.** (2012). Helping Displaced Students in the Wake of Hurricane Sandy. Commentary on the *RAND Blog*. <http://www.rand.org/blog/2012/10/helping-displaced-students-in-the-wake-of-hurricane.html>

**Pane, J. F.** (2007). When Students Disappear...: The Need for a National System to Share Student Information. *Education Week*, 26(24), 48.

### **Invited Presentations and Keynotes**

“Measuring Personalized Learning,” Invited Panelist, *LEAP Innovated Summit*, August 28, 2018, Chicago, IL.

“Emerging Personalized Learning Research and Best Practices: Does it Work?,” Invited Panelist, *Personalized Learning Leadership: Moving from Theory to Action*, Pittsburgh Personalized Learning Network Conference, June 26, 2018, Pittsburgh, PA.

“Technology-Enabled Adaptive Learning: Effects, Implementation Challenges, and Evidence-Based Adoption,” Invited presentation at *Understanding the Barriers to Adoption of Technology in Education*, Carnegie Mellon University, June 1-2, 2018, Pittsburgh, PA.

“But Does it Work?,” Invited Panelist, *2018 ASU+GSV Summit*, April 16-18, 2018, San Diego, CA.

“Personalized Learning: New Strategies for Leveraging Technology to Improve Education Outcomes,” Invited Panelist, *Relevance & Rigor: Creating the Future of Education Research*, IES Annual Principal Investigator Meeting, January 9-10, 2018, Arlington, VA.

“Evidence on Leveraging Technology to Improve Education Outcomes,” Invited presentation at *OECD-IES Seminar on Using Educational Research and Innovation to Address Inequality and Achievement Gaps in Education*, December 11-12, 2017, Washington, DC.

“Personalized Learning: New Strategies for Leveraging Technology in Education,” Invited presentation at *Topics in Education Policy*, Pennsylvania Center for Women & Politics, November 16, 2017, Pittsburgh, PA.

“Informing Progress: Insights on Personalized Learning Implementation and Effects,” Invited presentation at *Hunt Institute Common Core State Standards Partners*, August 2, 2017, Durham, NC.

“The Growing Trend Toward Personalized Learning: Insights on What It Is, Its Implementation, and Early Effects,” Invited Panelist, *2017 Conference of the Society for Research on Educational Effectiveness*, March 1-4, 2017, Washington, DC.

“Opportunities and Challenges of Digital Learning,” Invited Panelist, *Digital Media and Developing Minds*, Arthur M. Sackler Colloquium, National Academy of Sciences, October 13-15, 2015, Irvine, CA.

“Interim Research Findings on Schools Pursuing Personalized Learning,” Invited presentation at *Michigan Virtual Learning Research Institute*, January 15, 2015, Lansing, MI.

“Measuring Educational Success: Data Driven Decisionmaking,” Invited presentation at *100 Black Men Leadership Development Institute on Intervention Strategies for Realizing the Potential of All Students*, March 31, 2007, Jackson, MS.

“Data Driven Decisionmaking in Southwestern Pennsylvania School Districts,” Keynote address, *Educational Leadership Initiative Symposium on Finding the Time to use Data to Drive Instructional Decisions in Districts, Schools, and Classrooms*, May 16, 2006, Pittsburgh, PA.

## Media Interviews

Print: *New York Times*, *Education Week*, *Financial Times*, *Associated Press*, *The Atlantic*, *Bloomberg Business*, *Bloomberg News*, *Christian Science Monitor*, *Pittsburgh Post-Gazette*, *Pittsburgh Tribune-Review*, *Pittsburgh Quarterly*, *The Daily Telegraph (MI)*, *Baton Rouge Advocate*.

Radio: *KPCC Pasadena*, *Louisiana Radio Network*, *Sirius Satellite Radio*.

Online Media: *Hechinger Report*, *Politico*, *The 74 Million*, *Chalkbeat*, *Mindshift by KQED San Francisco*, *EdSurge*, *THE Journal*, *District Administration*.

## Selected Grants and Contracts

Formative Evaluation of History Maker, \$39,876, Schell Games, subcontract on U.S. Department of Education award 91990018C0028, subcontract Principal Investigator, 2018-2019.

Long term effects of competency-based education, \$89,115, Knowledgeworks Foundation, Principal Investigator, 2018-2019.

Continued Formative Evaluation and Pilot Study of SuperChem VR: The Immersive Reality Chemistry Game, \$200,000, Schell Games, subcontract on U.S. Department of Education award EDIES17C0035, subcontract Principal Investigator, 2017-2019.

Formative Evaluation of SuperChem VR: The Immersive Reality Chemistry Game, \$29,945, Schell Games, subcontract on U.S. Department of Education award EDIES16C0009, subcontract Principal Investigator, 2016.

Efficacy of ALEKS for Improving Student Algebra Achievement, \$1,543,409, U.S. Department of Education award R305A140221, Principal Investigator, 2014-2019.

Analyzing Student Usage and Outcome Data from a Randomized Experiment of Cognitive Tutor Algebra, \$359,521, U.S. National Science Foundation award DRL-1420374, Principal Investigator, 2014-2017.

Evaluation of Appalachian Renaissance Initiative, \$1,390,490, Kentucky Valley Education Cooperative, subcontract on U.S. Department of Education Race to the Top District grant, subcontract Principal Investigator, 2014-2018.

Summer Learning Efficacy Experiment, \$5,000,000, Wallace Foundation, co-Principal Investigator, 2013-2018.

Evaluation of Evaluation of Personalized Learning School Models, \$3,360,250, Bill & Melinda Gates Foundation, Principal Investigator, 2012-2017.

Evaluation of Career and College Readiness Transformations, \$707,127, Kentucky Valley Education Cooperative, subcontract on U.S. Department of Education Investing in Innovation development grant, subcontract Principal Investigator, 2012-2017.

Carnegie Mellon and RAND Traineeships (CMART) in Methodology and Interdisciplinary Research, \$654,619, U.S. Department of Education award R305B100012, co-Director, 2010-2015.

Education Technology Research and Practice: Recent Trends and Opportunities for Southwestern Pennsylvania, \$45,000, Claude Worthington Benedum Foundation, Grable Foundation, Heinz Endowments, and Pittsburgh Foundation, co-Principal Investigator, 2009-2010.

Effectiveness of Cognitive Tutor Algebra I Implemented at Scale, \$5,999,950, U.S. Department of Education award R305A070185, Principal Investigator, 2007-2013.

Experimental Field Study of the Cognitive Tutor Geometry Curriculum, \$1,255,961, U.S. Department of Education award R305F050122, Principal Investigator, 2005-2010.

Data Driven Decisionmaking in Southwestern Pennsylvania Schools, \$132,000, Heinz Endowments and Grable Foundation, Principal Investigator, 2004-2006.

Evaluation of Math Science Partnership of Southwest Pennsylvania, \$1,986,120, Allegheny Intermediate Unit, subcontract on National Science Foundation award EHR-0314914, subcontract Principal Investigator, 2003-2009.

Cognitive Tutor Curricula in Southwestern Pennsylvania, \$28,330, School Performance Network, Principal Investigator, 2003-2004.

Evaluation of Quaker Valley Digital School District, \$60,000, Quaker Valley School District, Principal Investigator, 2003.

### **Awards and Honors**

RAND Distinguished Chair in Education Innovation, limited-term position, 2015 to 2018.

*Most influential paper for important influences on VL/HCC research or commerce over the last 10 years* by the 2012 IEEE Symposium on Visual Languages and Human-Centric Computing, for “Using HCI Techniques to Design a More Usable Programming System,” Pane, Myers, & Miller (2002).

RAND Bronze Medal Awards, 2004 and 2007.

### **Supervision, Advising and Mentorship**

Adam Sales, Postdoctoral Fellow, Carnegie Mellon and RAND Traineeships in Methodology and Interdisciplinary Research (CMART), 2013-2015.

Andrea Bingham, Ph.D. candidate, University of Southern California Rossier School of Education, RAND Summer Intern, May to August 2014.

Sarah Ryan, Postdoctoral Fellow, Carnegie Mellon and RAND Traineeships in Methodology and Interdisciplinary Research (CMART), 2012-2014.

Julia Kaufman, Postdoctoral Fellow, Carnegie Mellon and RAND Traineeships in Methodology and Interdisciplinary Research (CMART), 2010-2012.

Rudolfo Angeles, Ph.D. candidate, Stanford University, Department of Statistics, RAND Summer Intern, June to September 2007.

Jennifer Steele, Ph.D. candidate, Harvard Graduate School of Education, RAND Summer Intern, June to September 2006.

### **Professional Activities**

Scientific Review Panel, Institute for Education Sciences, U.S. Department of Education: Mathematics and Science, 2008-12, 2014-17 (Panel Chair, 2011-12, 2014-15); State Education Programs and Policies, 2015 (Panel Chair).

Remake Learning Council (2014-present). The council provides strategic leadership to the Pittsburgh region's Remake Learning, which connects children with innovative learning programs in schools, museums, libraries, community centers, and online.

Research Advisory Board, LEAP Innovations (2016-present). LEAP is a Chicago-based nonprofit organization connecting innovation and education.

Research Advisory Board, Imagine Worldwide (2018-present). Imagine Worldwide seeks to leverage technology to empower children in developing countries to build literacy and numeracy skills.

Advisory Board, RAND Center for Causal Inference, 2015 to present.

Invited Expert, Technical Working Group on Building Evidence: What Comes After an Efficacy Study?, Institute for Education Sciences, U.S. Department of Education, October 2016.

Program Chair, 2013 Fall Conference of the Society for Research on Educational Effectiveness.

Scientific Review Panel, National Science Foundation, REESE Program, 2012.

Invited Discussant, Improving Mathematics and Science Outcomes in Middle School, Institute for Education Sciences, U.S. Department of Education, March 2011.

Invited Scientific Advisor, Research Methods Meeting, Institute for Education Sciences, U.S. Department of Education, October 2010.

Member of Technical Working Group, Feasibility of an Experimental Study of Highly Selective Routes to Alternative Certification, Institute for Education Sciences, U.S. Department of Education, January 2008.

Chair, Graduate Student Consortium, IEEE Symposia on Visual Languages and Human-Centric Computing, 2004-2008.

Program committee, IEEE Symposia on Visual Languages and Human-Centric Computing, 2010.

Reviewer of proposals for the Spencer Foundation, 2009-2011.

Reviewer of papers for: Journal of Research on Educational Effectiveness, Educational Researcher, Teachers College Record, AERA Open Journal, American Journal of Education, Cognitive Science, American Educational Research Association Annual Meeting, ACM Transactions on Computer-Human Interaction, International Journal of Human-Computer Studies, CHI Conference on Human Factors in Computing Systems, IEEE Symposia on Visual Languages and Human-Centric Computing, and Graphics Interface.