

Rafael A. Irizarry, PhD

Current Appointments: Professor, Biostatistics, Johns Hopkins Bloomberg School of Medicine

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Biography:

Dr. Irizarry has worked on Bioinformatics and Computational Biology problems for nine years. He has developed and published various widely used statistical methods for the analysis of microarray data. Two of his publications have been named Fast Breaking Paper, New Hot Paper, and Current Classic Paper in Mathematics by Thomson Essential Science Indicators (ESI). One of his publications won the 2004 American Statistical Association (ASA) Outstanding Statistical Application Award, which recognizes a paper that is an outstanding application of statistics in any substantive field. He was awarded the ASA Youden Award in Interlaboratory Testing for another of his publications. Dr. Irizarry also develops open source software implementing his statistical methodology. He developed the first extensible software library for the analysis of Affymetrix microarray probe-level data. His software tools have been downloaded over 20,000 times. He is also a leader and founder of the Bioconductor Project, an open source and open development software project for the analysis and comprehension of genomic data. Bioconductor provides the most widely used software tool for the analysis of microarray data. A book, co-edited by Dr. Irizarry and other project leaders, has sold over 10,000 copies in less than three years and has been translated to Chinese and Japanese. Dr. Irizarry has participated in various successful collaborations with JHU scientists. His collaborators include Jef Boeke, Aravinda Chakravarti, Andrew Feinberg, Sarah Wheelan, and Jonathan Pevsner. He has published over 40 collaborative papers. He is the Department of Biostatistics faculty liaison to the Johns Hopkins Medical Institution's Microarray Core. Dr. Irizarry is also a member of various international collaborative projects. He is a member of the NCI/OBRR-BRN Experimental Design Working Group, the GAIN Alternative Calling Algorithms Working Group, the EMERALD Project scientific advisory board, and the MGED Advisory Board.

Education And Training:

BS	1993	University of Puerto Rico, Río Piedras	Mathematics
PhD	1998	University of California, Berkeley	Statistics

Selected publications:

1. Wang W, Carvalho B, Miller N, Pevsner J, Chakaravarti A, **Irizarry** RA (2008) Estimating Genome-Wide Copy Number Using Allele Specific Mixture Models. *Journal of Computational Biology*
2. Bjornsson HT, Sigurdsson MI, Fallin MD, **Irizarry** RA, Aspelund T, Cui H, Yu W, Rongione MA, Ekström TJ, Harris TB, Launer LJ, Eiriksdottir G, Leppert MF, Sapienza C, Gudnason V, Feinberg AP (2008) Intra-individual change over time in DNA methylation with familial clustering. *JAMA* 299(24):2877-2883.
3. Lin S, Carvalho B, Cutler D, Arking D, Chakravarti A, **Irizarry** RA (2008) Validation and Extension of an Empirical Bayes Method for SNP Calling on Affymetrix Microarrays. *Genome Biology*. To appear.
4. **Irizarry** RA, Ladd-Acosta C, Carvalho B, Wu H, Brandenburg SA, Wen B, Feinberg AP (2008) Comprehensive High-throughput Arrays for Restriction endonuclease-based Methylation (CHARM). *Genome Research*. To appear
5. Zilliox MJ, **Irizarry** RA (2007) A Gene Expression Bar Code for Microarray Data. *Nature Methods* 4(11):911-913.
6. Carvalho B, Bengtsson H, Speed TP, **Irizarry** RA (2007) Exploration, Normalization, and Genotype Calls of High Density Oligonucleotide SNP Array Data. *Biostatistics* 8(2):485-99.
7. Wheelan S, Scheifele L, Martinez-Murillo F, **Irizarry** RA, Boeke J (2006) The Transposon Insertion site Profiling Chip (TIP-chip). *Proceeding of the National Academy of Science* 103(47):17632-7.
8. Wheelan S, **Irizarry** RA, Martinez-Murillo F, Boeke J (2006) Stacking the deck: double-tiled DNA microarrays. *Nature Methods* 3(11):903-7. (To appear)
9. **Irizarry** RA, Cope LM, Wu Z (2006) Feature-level exploration of a published Affymetrix GeneChip control dataset. *Genome Biology* 7(8):404

10. Quackenbush J, **Irizarry RA** (2006) Response to Shields: 'MIAME, we have a problem. *Trends in Genetics* 22(9): 471-472.
11. Takahashi H, McCaffery JM, **Irizarry RA**, Boeke JD (2006) Nucleocytosolic acetyl-coenzyme a synthetase is required for histone acetylation and global transcription. *Molecular Cell* 23(2):207-217.
12. Quackenbush J, Stoeckert C, Ball C, Brazma A, Gentleman R, Huber W, **Irizarry R**, Salit M, Sherlock G, Spellman P, Winegarden N (2006) Top-down standards will not serve systems biology. *Nature* 440(7080):24.
13. **Irizarry RA**, Zhijin Wu, Jaffee, H (2006) Comparison of Affymetrix GeneChip Expression Measures. *Bioinformatics* 22(7):789-94.
14. **Irizarry RA**, Warren D, Spencer F, Kim IF, Biswal S, Frank BC, Gabrielson E, Garcia JG, Geoghegan J, Germino G, Griffin C, Hilmer SC, Hoffman E, Jedlicka AE, Kawasaki E, Martinez-Murillo F, Morsberger L, Lee H, Petersen D, Quackenbush J, Scott A, Wilson M, Yang Y, Ye SQ, Yu W (2005) Multiple-laboratory comparison of microarray platforms. *Nature Methods* 2:329-30.
15. Kendzierski C, **Irizarry RA**, Chen K-S, Haag JD, Gould MN (2005) On the utility of pooling biological samples in microarray experiments. *Proceedings of the National Academy of Science* 102: 4252-4257.
16. Wu Z, **Irizarry RA** (2005) Stochastic Models Inspired by Hybridization Theory for Short Oligonucleotide Arrays. *Journal of Computational Biology*. 12(6): 882-93.
17. Wu Z, **Irizarry RA** (2004) Processing of oligonucleotide array data. *Nature Biotechnology* 22: 4-5.
18. Gautier L, Cope LM, Bolstad BM, **Irizarry RA** (2004) affy - An R package for the analysis of Affymetrix GeneChip data at the probe level. *Bioinformatics*. 20: 307-315.
19. Sidransky D, **Irizarry RA**, Califano JA, Li X, Ren H, Benoit N, Mao L (2003) Serum protein MALDI profiling distinguishes upper aerodigestive tract cancer patients from controls. *Journal of the National Cancer Institute* 95:1711-1777.
20. **Irizarry RA**, Bolstad BM, Collin F, Cope LM, Hobbs B, Speed TP (2003) Summaries of Affymetrix GeneChip probe level data. *Nucleic Acids Research* 31:e15
21. **Irizarry RA**, Hobbs B, Collin F, Beazer-Barclay YD, Antonellis KJ, Scherf U, Speed TP (2003) Exploration, normalization, and summaries of high density oligonucleotide array probe level data. *Biostatistics* 4:249-264

Books:

1. Gentleman R, Carey V, Huber W, **Irizarry RA**, Dudoit, S (2005) *Bioinformatics and Computational Biology Solutions using R and Bioconductor*, eds. Springer. NY.
2. Parmigiani G, Garrett ES, **Irizarry RA**, Zeger SL (2003) *The Analysis of Gene Expression Data: Methods and Software*, eds. Springer. NY.

Patent Pending:

Comprehensive High-throughput Arrays for Restriction endonuclease-based Methylation (with Feinberg)
 A Gene Expression Barcode for Microarray Data (with Zilliox)

Mentoring:

PhD Thesis Advisor	Zhijin Wu,	Biostatistics	2005
	Benilton Carvalho	Biostatistics	2008 (expected)
	Hao Wu	Biostatistics	2009 (expected)
	Matthew McCall	Biostatistics	2010 (expected)
	Samara Kiihl	Biostatistics	2011 (expected)
Master's Advisees	Richard Ittenbach	Biostatistics	2001
	Daniel Yuan	Biostatistics	2006
	Peter Murakami,	Biostatistics	2008

Peer Reviewer:

Associate Editor for Annals of Applied Statistics, *Associate Editor* for Biostatistics, and Editorial Board for BMC Bioinformatics. Referee for 35 journals including Annals of Biomedical Engineering, Genome Research, Journal of the American Statistical Association, Journal of Clinical Epidemiology, Journal of the National Cancer Institute, Nature, Nature Biotechnology, Nature Genetics, Nature Methods, Nature Nanotechnology, New England Journal of Medicine, The Lancet, PLoS Medicine, PNAS.