

PERRY WATTS

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CURRENT GOALS:

To develop expertise in ODS statistical graphics and to write a book that shows how to graph challenging data sets.

EDUCATION:

1995-1998

MS Degree in Information Systems from Drexel University, Philadelphia, PA. Completed courses in Systems Analysis and Design (2), Systems Implementation and Evaluation (2), Database Design (3), C and C++ Programming, The Internet, Multimedia, Computer Networks, and Human-Computer Interaction (GPA 4.0). Honors: Beta Phi Mu.

1986-1997

Supplemental course work in mathematics, statistics and computer science at Montgomery County Community College (MCCC) and Philadelphia College of Textiles and Science.

1985

BS Degree with departmental honors in Computer Science from Beaver College, Glenside, PA. Languages studied were FORTRAN, BASIC, PASCAL, COBOL, and MACRO-11 Assembly Language. Additional courses in operating systems, data structures, software design, computer architecture, and graphics (GPA 4.0).

Previous Degrees:

MSS (Masters Degree in Social Service) from Bryn Mawr College, Bryn Mawr, PA.

BA in sociology from the University of Minnesota, Minneapolis, Minnesota. Honors: Phi Beta Kappa.

SOFTWARE SKILLS:

Computer Languages: SAS, SAS Macro Language, EXCEL 4 Macro Language, C, C++, and FORTRAN.

Graphics: SAS/GRAPH including ANNOTATE, GREPLAY, GPLOT, and GCHART. ODS Statistical Graphics including the SG PROCs and Graph Template Language.

Operating Systems: MS Windows.

Text Processing and Report Generation: Microsoft EXCEL with DDE plus PROCs TABULATE and REPORT.

Additional SAS Utilities and Procedures: ODS, SQL, TRANSPOSE, FORMAT, FREQ, UNIVARIATE and others.

WORK EXPERIENCE:

January 10, 2011 – present

Senior Statistical Programmer. I have come out of retirement to join Stakana Analytics, a statistical consulting company headed by Nate Derby in Seattle, WA. My role at Stakana is to develop graphs that support statistical results from assigned projects.

February, 2006 – December, 2007

Contract Programmer employed by COMSYS and assigned to Sanofi Aventis to develop, implement, and document a graphics package used at every branch in the company.

March, 2001 - June, 2005

Independent Consultant. The IMS Health long-term project described in the next paragraph was extended to update medical codes on an annual basis. At Fox Chase Cancer Center, activity was primarily focused on a long-term, multi-center pooled study. Short-term programming assignments for the biostatistics department were also completed. Reports were generated in ODS. ODS Graphics and SAS/GRAPH software were used to plot survival curves, bar charts, box plots and scatter plots. DDE was used to read data into SAS data sets from EXCEL spreadsheets.

June, 1998 - March, 2001

Senior Statistical Programmer at IMS Health in Plymouth Meeting, PA. Produced customized reports from a large Claims database using PROC SQL for record selection and the TABULATE and REPORT procedures for

output. Replaced histograms with a set of SAS/GRAPH generated Violin Plots to enhance the visual display of grouped continuous data. Completed a two-year re-engineering assignment for a major supplier of data to IMS Health. Tasks involved reverse-engineering 30,000 lines of inherited code, re-design, implementation and testing.

September, 1994 - December, 1997

Independent Consultant assigned to the National Institutes of Health: National Institute of Allergy and Infectious Disease (NIAID) Grant #6207-01/03 entitled *Models of Mutation and Clonal Growth in Immune Response*. The Principal Investigator for this grant was Dr. Samuel Litwin, Sr. Biostatistician at Fox Chase Cancer Center. Used Symantec C and SAS software to process and display amino acid sequences in a readable format. Displayed histograms of the Shannon measure of amino acid diversity with SAS/GRAPH software. Additional work for the grant is described in the first three entries listed under "A Sample of Programming Projects" below.

June, 1993 - August, 1994

Statistical Programmer at US Bioscience in West Conshohocken, PA. Implemented Statistical Analysis Plans for NDA's using SAS and SAS/GRAPH software. Created data listings and reports for submissions to the FDA. Developed software to automate patient randomizations to clinical trials using the `%window` SAS macro utility.

August, 1992 - March, 1993

Programmer-Analyst at the American College of Radiology in Philadelphia, PA. Assigned to the computer department to provide end user support to statisticians and data managers. Answered SAS coding questions, updated FORTRAN DBMS code, wrote Datatrieve applications, installed software on MACs and PCs, and wrote the fourth entry listed under "A Sample of Programming Projects".

September, 1983 - August, 1992

Scientific Programmer in the biostatistics department at Fox Chase Cancer Center in Philadelphia, PA. The biostatistics department develops methods of analysis for solving a variety of biological, clinical and epidemiological problems. Wrote the remaining applications programs listed under "A Sample of Programming Projects" and functioned as the Center's first SAS Software Representative.

Before 1983

Worked in a variety of settings as a clinical social worker, agency branch office supervisor, and field instructor for graduate social work students.

A SAMPLE OF GRAPHICS PROGRAMMING PROJECTS FROM 1983-1997:

- Wrote an application in Symantec C for the Macintosh Power PC that converts amino acid sequences to single letter representations and calculates the Shannon measure of diversity $\pm n$ standard deviations. Output could be quickly graphed with SAS/GRAPH Software.
- Implemented a tree-structured recursive partitioning technique to define and compare all possible binary splits of a survival data set with up to fifty ordinal or nominal covariates. At each node of the tree the single covariate split yielding the highest Peto-Prentice (logrank) χ^2 is recorded. Subgroups created by the winning split define the next generation of nodes, and the comparative process is repeated with more restricted subsets of the data. Stopping occurs when the data are exhausted or when comparisons are no longer statistically significant. This program is written in FORTRAN with a SAS/GRAPH optional display of the newly created binary tree.
- Used the annotate facility from SAS/GRAPH software together with SAS macros to produce multiple Kaplan-Meier curves suitable for publication. Censored observations are superimposed on the curves, and labeling is automated for multiple subgroup displays.
- Created a graphics display of a dendrogram using SAS/STAT's PROC Cluster with SAS/GRAPH to measure evolutionary distances among individuals determined by DNA analysis.
- Used SAS/GRAPH software to create sampled binary trees where cells give rise to one or two *daughters*, and incomplete binary trees with zero or two *daughter* cells. These trees were used to model the effects of somatic cell mutation and selection on immune cells collected many cell divisions after the onset of infection.
- Created a disc and stick model using SAS/GRAPH for three-dimensional representation of amino acid diversity among residues placed on the α -carbon backbone of a selected antibody.

PUBLICATIONS, HONORS, PATENT DESCRIPTION, AND PROFESSIONAL AFFILIATIONS:

Publications and Proceedings:

1. Ura, H., P. Nowak, S. Litwin, **P. Watts**, R. Bonfil, and A. Klein-Szanto. *Effects of Formaldehyde on Normal Xenotransplanted Human Tracheobronchial Epithelium*. AMERICAN JOURNAL OF PATHOLOGY, Vol. 134, No. 1, January, **1989**.
2. Clapper, Margie L., S. Hoffman, N. Carp, **P. Watts**, L. Seestaller, J. Weese, and K. Tew. *Contribution of patient history to the glutathion S-transferase activity of human lung, breast and colon tissue*. CARCINOGENESIS, Vol. 12, No. 10, pp. 1957-1961, **1991**.
3. **Watts, P.**, and S. Litwin. *Using SAS/GRAPH® Software to Create Trees that Model Developmental Biological Phenomena*. PROCEEDINGS OF SAS USERS GROUP INTERNATIONAL SIXTEENTH ANNUAL CONFERENCE. SAS Institute, Inc. Cary, NC, pp. 779-784, **1991**.
4. Weiner, L., K. Padavic-Shaller, J. Kitson, **P. Watts**, R. Krigel and S. Litwin. *Phase I Evaluation of Combination Therapy with Interleukin 2 and γ -Interferon*. CANCER RESEARCH, Vol. 51, pp. 3910-3918, August 1, **1991**.
5. Carp, Ned Z., D. Ellison, P. Brophy, **P. Watts**, M. Chang, and S. Keller. *DNA Content in Correlation with Postsurgical Stage in Non-Small Cell Lung Cancer*. ANN THORAC SURG, Vol. 53, pp. 680-683, **1992**.
6. Hudes, Gary R., R. Greenberg, R. Krigel, S. Fox, R. Scher, S. Litwin, **P. Watts**, L. Speicher, K. Tew, and R. Comis. *Phase II Study of Estramustine and Vinblastine, Two Microtubule Inhibitors, in Hormone-Refractory Prostate Cancer*. JOURNAL OF CLINICAL ONCOLOGY, Vol. 10, No. 11, pp. 1754-1761, November, **1992**.
7. **Watts, P.**, and S. Litwin. *Using SAS/GRAPH® Software for Three-Dimensional Illustrations of Amino Acid Diversity*. PROCEEDINGS OF SAS USERS GROUP INTERNATIONAL SEVENTEENTH ANNUAL CONFERENCE. SAS Institute, Inc. Cary, NC, pp. 1249-1254, **1992**.
8. Fine, Manette K., B. Rimer, and **P. Watts**. *Women's Responses to the Mammography Experience*. JABFP, Vol. 6, No. 6, pp. 546-555, Nov-Dec, **1993**.
9. Weiner, L., G. Hudes, J. Kitson, J. Walczak, **P. Watts**, S. Litwin, and P. O'Dwyer. *Preservation of immune effector cell function following administration of a dose-intense 5-fluorouracil-chemotherapy regimen*. CANCER IMMUNOL IMMUNOTHER (1993).
10. Fox, Kevin R., J. Glick, J. Schulz, C. Vogel, P. Byrne, J. Ahlgren, L. Demers, G. Conner, R. Reynolds, E. Mitchell, R. Capizzi, B. Jones, **P. Watts**, P. Schein, and the Rogletimide Breast Cancer Study Group. *Rogletimide May Increase the Clearance of Estrone Sulfate in Postmenopausal Females When Administered as Therapy for Advanced Metastatic Breast Cancer*. 17th ANNUAL SAN ANTONIO BREAST CANCER SYMPOSIUM, **1994**.
11. Matsubara, Nagahide, O. Hietala, S. Gilmour, K. Yum, S. Litwin, **P. Watts**, E. Brennan and T. O'Brien. *Association between High Levels of Ornithine Decarboxylase Activity and Favorable Prognosis in Human Colorectal Carcinoma*. CLINICAL CANCER RESEARCH, Vol. 1, pp. 665-671, June, **1995**.
12. Pendurthi, T.K., H.S. Cooper, N.A. Young, J.P. Hoffman, S. Litwin, **P. Watts**, D.E. Johnson, B.L. Eisenberg. *Histopathologic Effects of Preoperative Chemoradiotherapy on Pancreatic Carcinoma*. THE SOCIETY FOR SURGERY OF THE ALIMENTARY TRACT, INC. ANNUAL MEETING, **1996**.
13. **Watts, P.**, and S. Litwin. *Using Graphics Capabilities to Enhance SAS/AF Frame Output*. PROCEEDINGS OF 9TH ANNUAL NORTHEAST SAS USERS GROUP CONFERENCE. Boston, Massachusetts, pp. 442-449, **1996**.
14. Mitsunaga, S., M. Clapper, S. Litwin, **P. Watts**, B. Bauer, and A.J.P. Klein-Szanto. *Chemopreventive Effects of difluoromethylornithine (DFMO) on Mouse Skin Squamous Cell Carcinomas Induced by benzo(a)pyrene*. JOURNAL OF CELLULAR BIOCHEMISTRY SUPPLEMENTS 28/29: 81-89, **1997**.
15. Stewart, J.J., C.Y. Lee, S. Ibrahim, **P. Watts**, M. Shlomchik, M. Weigert, and S. Litwin. *A Shannon entropy analysis of immunoglobulin and T cell receptor*. Molecular Immunology, Vol.34, No. 15, pp. 1067-1082, **1997**.
16. **Watts, P.** *Tips for Producing Customized Graphs with SAS/GRAPH® Software*. PROCEEDINGS OF THE 10TH ANNUAL NORTHEAST SAS USERS GROUP CONFERENCE. Baltimore, Maryland, pp. 497-505, **1997**.
17. Shlomchik, M.J., **P. Watts**, M. Weigert, and S. Litwin . "Clone. A Monte-Carlo Computer Simulation of B Cell Clonal Expansion, Somatic Mutation and Antigen-Driven Selection." *Somatic Diversification of Immune Responses*. Ed. Gkelsoe and M.F. Flanjnik. Berlin, Germany: Springer-Verlag 173-197, **1998**.
18. **Watts, P.** *Managing SAS/GRAPH® Displays with the GREPLAY Procedure*. PROCEEDINGS OF THE 11TH ANNUAL NORTHEAST SAS USERS GROUP CONFERENCE. Pittsburgh, Pennsylvania, pp. 439-445, **1998**.

19. **Watts, P.** *Three Unrelated Tips that Solve Three Unrelated SAS Problems.* PROCEEDINGS OF THE 12TH ANNUAL NORTHEAST SAS USERS GROUP CONFERENCE, Washington, D.C., pp. 348-349, **1999**.
20. **Watts, P.** *Using Format Concatenation in SAS® Software to Decode Data in Longitudinal Studies.* PROCEEDINGS OF THE 12TH ANNUAL NORTHEAST SAS USERS GROUP CONFERENCE. Washington, D.C., pp. 680-686, **1999**.
21. **Watts, P.,** and J. Gerlach. *A SAS® Software Toolkit for Reverse Engineering Large Projects.* PROCEEDINGS OF THE 13TH ANNUAL NORTHEAST SAS USERS GROUP CONFERENCE. Philadelphia, PA, pp. 138-145, **2000**.
22. Stewart, JJ, **Watts, P.,** and Litwin, S. *An algorithm for mapping positively selected members of quasispecies-type viruses.* BMC Bioinformatics (**2001**) 2:1< <http://www.biomedcentral.com/1471-2105/2/1/>> (06 Mar 2001).
23. **Watts, P.** *Defining Colors with Precision in Your SAS/GRAPH® Application.* PROCEEDINGS OF THE 14TH ANNUAL NORTHEAST SAS USERS GROUP CONFERENCE. Baltimore, MD, pp. 347-348, **2001**.
24. **Watts, P.** *The Relationship Between Format Structure and Efficiency in SAS.* PROCEEDINGS OF THE 14TH ANNUAL NORTHEAST SAS USERS GROUP CONFERENCE. Baltimore, MD, pp. 697-705, **2001**.
25. **Watts, P.** *Multiple Plot Displays: Simplified with Macros.* Cary, NC: SAS Institute Inc., **2002**.
26. **Watts, P.** *Using ODS and the Macro Facility to Construct Color Charts and Scales for SAS® Software Applications.* Proceedings of the Twenty-Seventh SAS® User Group International Conference, Cary, NC: SAS Institute, **2002**, paper #125, **and** PROCEEDINGS OF THE 15TH ANNUAL NORTHEAST SAS USERS GROUP CONFERENCE. Buffalo, NY, **2002**, paper #gi007
27. **Watts, P.** and A. Wilson, Ph.D. *SAS® Techniques for Incorporating Medical Code Updates into Longitudinal Health Care Data.* PROCEEDINGS OF THE 15TH ANNUAL NORTHEAST SAS USERS GROUP CONFERENCE. Buffalo, NY, **2002**, paper #ad005
28. **Watts, P.** *Working with RGB and HLS Color Coding Systems in SAS® Software.* PROCEEDINGS OF THE 15TH ANNUAL NORTHEAST SAS USERS GROUP CONFERENCE. Buffalo, NY, **2002**, paper #ps013, **and** Proceedings of the Twenty-Eighth SAS® User Group International Conference, Seattle, WA, **2003**, paper #136.
29. **Watts, P.** *Advanced Programming Techniques for Working with Color in SAS® Software.* PROCEEDINGS OF THE 16TH ANNUAL NORTHEAST SAS USERS GROUP CONFERENCE. Washington, DC, **2003**, paper #at002, **and** Proceedings of the Twenty-Ninth SAS® User Group International Conference, Cary, NC: SAS Institute, **2004**, paper #091.
30. **Watts, P.** *New Palettes for SAS® Color Utility Macros.* PROCEEDINGS OF THE 16TH ANNUAL NORTHEAST SAS USERS GROUP CONFERENCE. Washington, DC, **2003**, paper #PS015, **and** Proceedings of the Twenty-Ninth SAS® User Group International Conference, Cary, NC: SAS Institute, **2004**, paper #162, **and** Proceedings of the 12th Annual Conference Western Users of SAS® Software, Inc. Pasadena, CA, **2004**, paper # i_post_new_palettes_for_sas_.pdf.
31. **Watts, P.** *Using Single-Purpose SAS® Macros to Format EXCEL Spreadsheets with DDE.* PROCEEDINGS OF THE 17TH ANNUAL NORTHEAST SAS USERS GROUP CONFERENCE. Baltimore, MD, **2004**, paper #ap06, **and** Proceedings of the Thirtieth SAS® User Group International Conference Cary, NC: SAS Institute, **2005**, paper #089.
32. **Watts, P.** *Highlighting Inconsistent Record Entries in EXCEL: Possible with SAS® ODS, Optimized in Microsoft® DDE.* PROCEEDINGS OF THE 17TH ANNUAL NORTHEAST SAS USERS GROUP CONFERENCE. Baltimore, MD, **2004**, paper #io01.
33. **Watts, P.** *Generating Program-Stamped Output in an Interactive SAS Session: Easy in V8, Automated in V9.* PROCEEDINGS OF THE 18TH ANNUAL NORTHEAST SAS USERS GROUP CONFERENCE. Portland, ME, **2005**, paper #pm11.
34. **Watts, P.** *Using Database Principles to Optimize SAS® Format Construction from Tabular Data.* Proceedings of the Thirty-First SAS® User Group International Conference Cary, NC: SAS Institute, **2006**, paper #245.
35. Henry LR, Goldberg M, Scott W, Konski A, Meropol NJ, Freedman G, Weiner L, **Watts P,** Beard M, McLaughlin S, Cheng JD. *Induction Cisplatin and Paclitaxel, followed by Combination Chemoradiotherapy with 5-FU, Cisplatin, and Paclitaxel Prior to Resection in Localized Esophageal Cancer- A Phase Two Report.* Ann Surg Oncol. **2006** Feb;13(2):214-20.

36. **Watts, P.** *Building a Better Bar Chart with SAS/GRAPH® Software.* PROCEEDINGS OF THE 20TH ANNUAL NORTHEAST SAS USERS GROUP CONFERENCE. Baltimore, MD, **2007**, paper #np16.
37. **Watts, P.** *Charting the Basics with PROC GCHART.* PROCEEDINGS OF THE 20TH ANNUAL NORTHEAST SAS USERS GROUP CONFERENCE. Baltimore, MD, **2007**, paper #ff17.
38. **Watts, P.** *Generate a Customized Axis Scale with Uneven Intervals in SAS® - Automatically.* PROCEEDINGS OF THE 21ST ANNUAL NORTHEAST SAS USERS GROUP CONFERENCE. Pittsburgh, PA, **2008**, paper #po11 **and** Proceedings of the SAS® Global Forum 2009 Conference, Cary, NC: SAS Institute, paper # 192-**2009**.
39. **Watts, P.** *Sensitivity Training for Building Better Bar Charts with SAS/GRAPH® Software.* PROCEEDINGS OF THE 21ST ANNUAL NORTHEAST SAS USERS GROUP CONFERENCE. Pittsburgh, PA, **2008**, paper #hw07.
40. **Watts, P.** *Using SAS® Software to Generate Textbook Style Histograms.* PROCEEDINGS OF THE 21ST ANNUAL NORTHEAST SAS USERS GROUP CONFERENCE. Pittsburgh, PA, **2008**, paper #np03 **and** Proceedings of the SAS® Global Forum 2009 Conference, Cary, NC: SAS Institute, paper # 216-**2009**.
41. **Watts, P.** *Enhancing Textbook-Style Histograms with the PLOTHISTON09 SAS® Macro.* PROCEEDINGS OF THE 22ND ANNUAL NORTHEAST SAS USERS GROUP CONFERENCE. Burlington, VT **2009**, paper # SA02.
42. **Watts, P.** *Getting the IN operator to FUNCTION inside a SAS® Macro.* PROCEEDINGS OF THE 22ND ANNUAL NORTHEAST SAS USERS GROUP CONFERENCE. Burlington, VT **2009**, paper #CC05.
43. **Watts, P.** *Macros and Conventional Macro Variables: Effective Tools for Customizing Tabular Output in SAS® ODS.* PROCEEDINGS OF THE 23RD ANNUAL NORTHEAST SAS USERS GROUP CONFERENCE, Baltimore, MD, **2010**, paper #CC32.
44. **Watts, P.** *Make the Most of Your Inheritance with the SAS® ODS Styles.Default Lineage Tracer.* PhilaSUG Fall Meeting, Villanova University, **2010**.
45. **Watts, P.** *Using Recursion to Trace Lineages in the SAS® ODS Styles.Default Template.* PROCEEDINGS OF THE 23RD ANNUAL NORTHEAST SAS USERS GROUP CONFERENCE, Baltimore, MD, **2010**, paper #BB13.
46. **Watts, P.** *Add Style to ODS Output by Stretching Your Inheritance in Version 9.2 SAS®.* Proceedings of the SAS® Global Forum 2011 Conference, Cary, NC: SAS Institute, paper # 251-**2011**.
47. **Watts, P.** and N. Derby. *Using SAS® GTL to Visualize Your Data When There is Too Much of It to Visualize.* PROCEEDINGS OF THE 24TH ANNUAL NORTHEAST SAS USERS GROUP CONFERENCE, Portland, ME, **2011**, paper #GR10. The paper has also been presented at additional regional SAS User's Conferences in 2011: MWSUG, WUSS, PNWSUG, and SESUG. It is being presented with 9.3 updates at the SAS® Global Forum 2012 Conference, Cary, NC: SAS Institute, paper #262-2012.
48. Derby, N., L. Vo, and **P. Watts.** *Graphing a Progression of Time Series Plots with ODS Graphics.* MWSUG 2011 CONFERENCE PROCEEDINGS, Kansas City, KA, 2011, paper #DG07. The paper has also been presented at additional regional SAS User's Conferences in 2011: WUSS, PNWSUG, and SESUG.

Honors:

1. Second Prize in the graphics competition for *Best Display of the Data* at SUGI-15 (SAS Users Group International) in Nashville, TN, April 1-4, 1990.
2. First Prize in the graphics competition for *Most Creative Software - Color* at SUGI-16 in New Orleans, LA, February 17-20, 1991.
3. First prize in the graphics competition for *Best Use of the Data - Color* at SUGI-17 in Honolulu, Hawaii, April 12-15, 1992.
4. Publication #7 from above was selected as the best contributed paper in the Posters section at SUGI-17.
5. Received the 1998 American Society for Information Science (ASIS) Excellence Award from the Drexel and Delaware Valley organization chapters for a paper entitled *Modeling Dynamic System Behavior with Object Interaction Diagrams* written with Cher ping Wong for a graduate course in Information Systems at Drexel University.
6. Publication #24 from above was given honorable mention in the Posters section at NESUG-14.
7. Publication #26 from above was selected as the best contributed paper in the Data Presentation section at SUGI-27.
8. Publication #28 from above was selected as the best contributed paper in the Posters sections at NESUG-15 and at SUGI-28.

9. Publication #30 from above was selected as the best veteran paper in the Posters sections at WUSS-12.
10. Publication #38 from above was selected as the best multi-panel poster at the NESUG-21.
11. Publication #47 from above was selected as the best paper in the Data Visualization and Graphics Section at MWSUG-2011 with Nate Derby presenting.

Patent:

Publication #22 from above was awarded patent: 6,337,181 from the US Patent & Trademark Office on January 8, 2002. I wrote the programs in C for the patent.

Professional Affiliations:

1. Information Visualization (graphics) Session Coordinator and Judge of the graphics competitions at SUGIs 18 and 19; Section Chair for Information Visualization at SUGI-20.
2. Session Coordinator for the North East SAS Users Group (NESUG) 7th, 8th, 9th, 18th, 21st, and 24th annual conferences; Posters Section Co-Chair for the 16th, 19th, 20th and 22nd annual conferences; Presentation Section Co-Chair for the 17th annual conference; Graphics and Reporting Section Co-Chair for the 25th annual conference.
3. Executive Committee Member and Posters Liaison at PhilaSUG (local SAS Users Group) from 1993 to 2004.