Jeffery L. Painter, JD, MSc

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Data & Code Wrangler

"Jeffery has ninja level coding skills." - Andy Beam,
http://beamlab.org/

Summary

I am an expert in engineering solutions for drug discovery and safety, with 18+ years of industry-valued experience. My work focuses on translating complex scientific ideas into production-ready systems and advancing AI/ML in highly regulated environments. I am recognized as an authoritative leader in pharmacovigilance and computational biology.

Notable achievements:

- Co-developed OMOP CDM, the industry standard for the sharing and analysis of real-world data.
- Co-developed the analysis framework utilized in the publication *"The support of human genetic evidence for approved drug indications"* (Nelson, et al., Nature Genetics 2015).
- Engineered a framework for analyzing social media data for drug safety, used at GSK and subsequently adopted by the World Health Organization.

Key AI/ML career highlights:

- *LLM Models*

  Leading the use of LLMs drug safety, model performance evaluation, and creating application guidelines for their use in highly regulated pharmacovigilance environments.

- *Knowledge Reasoning & Semantic Technologies*

  Developed phenotype maps for FinnGen and the GWAS catalog, utilized by Deerfield, GSK, and the Broad Institute, leveraging NLP methods, ontology development, and advanced knowledge representation.

- *Classical Machine Learning*

  Designed and implemented a predictive modeling engine for identifying target populations using random forest and hierarchical clustering for NC Medicaid/Medicare (2014-2015, see patents). Led the development of an ML/AI platform for patient phenotyping with the UK BioBank and the PPMI (Parkinson's Progression Markers Initiative), in collaboration with computational biologists and statistical geneticists (2019-2020).

Experience

Apache Software Foundation
Contributor and Member   *Aug 2004–Present*
Apache Turbine and Apache Torque

○ *Member* - Elected as a Member (`https://www.apache.org/foundation/members.html`) of the Apache Software Foundation Mar-2019

○ *Nomination* - Nominated as a candidate for the ASF Board of Directors for 2020

○ *Apache Turbine* - Long time contributor to the Apache Turbine project. The first OpenSource web framework which established a number of well-known sub-projects (Apache Velocity, Maven, Torque)

GlaxoSmithKline   **Durham, NC**
Sr Director, Quantitative Leader, Safety Innovation & Analytics   *Mar 2021–Present*
Global Safety

○ Quantitative lead on developing new methods and strategy for advancing the science of pharmacovigilance through the use of machine learning and AI.
○ Managing external engagement between GSK and beamlab (`http://beamlab.org/`) - Recently completed a systematic scoping review on the use of AI and ML in Pharmacovigilance to be published in the May 2022 special AI edition of Drug Safety
○ Developed ML methods for automatic classification of Medication Errors in ICSR (Individual Case Safety Reports)
○ Co-inventor on BEE App (Belamaf Eye Exam Grading Calculator) [patent filed Feb-2022] App released on for Apple iOS `https://apps.apple.com/cn/app/bee-belamaf-eye-exam/id1616472271`

Vesalius Therapeutics   **Cambridge, MA**
Senior Principal Scientist, Computational Biology and Data Science   *Feb 2019–Feb 2021*
Formerly Flagship Lab 60 (Flagship Pioneering) Head of bio-informatics

○ *Business Development* - Working with our lead statistical geneticist and business partners, in our first two months, worked to established computational methodology and biological platform for new drug-discovery model (Diamond technology platform) - Series A raising $75 million (USD). `https://tinyurl.com/2p8ff5y5`

○ *Data Imputation* - Developed new methods for handling missing value problems in longitudinal data by creating both Markov Models to discover population based trends for categorical data, and also employing the R package kmlShape (`https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0150738`) for the discovery of before unknown patient sub-populations using longitidunal trajectory analysis with kml (K-Means for Longitudinal Data).

○ *AWS* - All Flagship Pioneering labs are cloud first computing environments. Became quickly engrained in setting up, and administering our AWS infrastructure for analysis of WGS (whole-

genome sequencing) data and the day-to-day needs of our computational group. My prior work in system administration and deep knowledge of Linux/UNIX environments lowered the threshold on my personal transition to a cloud based computing environment. Familiar with AWS pricing models, setting up EC2 instances, S3 buckets, EFS shared storage and networking (e.g. Route53, Private VPN and VPN gateway configuration)

JiveCast   **Raleigh, NC**
CEO And Founder   *Sep 2016–Present*
Analytics and Consulting

○ *GWAS-MeSH Mapping* - Subcontractor to Deerfield (`https://deerfield.com`) : Developed new methods to map the GWAS catalog to MeSH headings in order to support proximity alignment between genes and medical conditions using both Lin and Resnik scoring algorithms through the UMLS-similarity Perl module.

○ *Gen-AERS* - Subcontractor to GlaxoSmithKline Statistical Genetics group : Built genetically enhanced version of the FDA Adverse Event reporting database for use in developing biomarker targets using advanced AI methods for ontology alignment and establishing robust multi-axial ontological relations between drugs, adverse events and genetic indications using the UMLS and DrugBank.ca knowledge sets. Fully implemented all statistical measures in Java per the EudraVigilance recommendations (`https://bit.ly/2ZRFIha`) for screening potential signals from noise for target gene-AE identification.

○ *Deep Learning Methods Development* - Project with Anexinet (now Verinext) - Assisted in developing Recurrent Neural Nets to assist in the automatic identification of Adverse Events in call center data. Implementation developed in Java using DeepLearning4j framework.

○ *Drug to Indication Maps* - Project with Spencer Health Solutions to develop a drug to indication mapping using custom built Java source and open knowledge sources (UMLS, etc).

○ *Social Media for Pharmacovigilance* - Subcontractor to GlaxoSmithKline : Provide expert consulting and programming for delivering key insights from social media analytics. Projects included crowdsourcing, Java development for UI and data analysis. Provided development of various classifiers using OpenNLP, WEKA and tensorflow for the automatic classification and tagging of hundreds of thousands of social media posts for various projects

GlaxoSmithKline   **Research Triangle Park, NC**
Director Medical Advanced Analytics - US Medical Affairs   *2006–2016*
Deployed Innovations:

○ *Medical Insight Explorer* - Web application and text analytics framework developed to help automate text classification and clustering for topic and trend analysis on unstructured voice of the customer feedback for US Medical Affairs. Enabling text analytics for a non-technical user base of 150 employees.

○ *Insight Explorer for Social Media* - Work flow management system for the annotation of social

media data for safety and pharmacovigilance - over 50,000 social media posts reviewed by the GSK safety listening laboratory leading to an improved understanding of the use, abuse, and benefits of marketed drugs.

○ C#/.Net Predictive Modeling Engine deployed in CareTriage® which executes patient risk models in real time using random forest, LASSO, and inverse logit regression. Currently active in 2 state medicare management systems.
https://www.communitycarenc.org/media/files/care-triage-announcement.pdf

○ *CodeSlinger* - Biomedical terminology code management tool for epidemiology and observational data analytics.

○ *BRAT* - Benefit Risk Analysis Toolkit - Collaboration between GSK, J&J, and AstraZeneca to standardize statistical analytical methods across the industry.

○ Constructed the foundational terminology mappings enabling SafetyWorks and OMOP to support disparate data sources for unified statistical analysis.
http://www.ubc.com/tags/safetyworks, http://omop.org

Kiasoft, Inc   **Cary, NC**
Founder   *2001–2004*

○ Developed SmartOrder™, a web based fulfillment and inventory management software system for LogosDirect.com.
  - Enabled real time inventory management and implemented predictive models to determine inventory requirements.
  - Deployed in 2003 and still in use, having completed over 100,000 orders.
○ Elected as an Apache community contributor to the Turbine top level project.

MCI Wolrdcom   **Cary, NC**
System Administrator   *2000–2001*

○ Supported 150+ software developers who were responsible for global network provisioning services. Administered Sun Solaris, AIX, DB/2 and Oracle systems.
○ Administrator for the Sun E10000 servers running WebLogic J2EE platform and Oracle databases.

SmartStart NC   **Raleigh, NC**
Programmer   *1999–2000*

○ Developed administration system for statewide financial managers written in Perl & PostgreSQL.

American Social Health Association   **RTP, NC**
Programmer   *1999*

○ Supported phone, network and servers for various CDC funded call centers.

UNC-TV   **RTP, NC**
System Administrator   *1998*

○ Supported phone, network and servers for television production and administrative use.

Osborne Computers   **Dalton, GA**
Systems Integrator   *1996-1997*
- Administered BSD web servers, RADIUS dial-up service.
- Built custom PC desktop and networks for local clients.

Presentations

- Nov 6, 2024 - PVNet, Artificial Intelligence and Machine Learning in Pharmacovigilance, Jeffery Painter & Vijay Kara

- Aug 23, 2023 - Keynote Address, The First BMCC Data Science Symposium
  Talk Title: *Machine Learning and Model Building for Drug Safety*
  Invited keynote for *Creating Data Science Pathways for STEM Student Success*
  BMCC, CUNY, 199 Chambers Street, NYC 10007

- Jan 15, 2020 - "Why Apache? Trillions and Trillions Served: the documentary on The Apache Software Foundation"
  Video: `https://www.youtube.com/watch?v=YM5dLvNatRs`
  Jeffery begins at 0:25s

- Sept 2018 - ApacheCon 2018 - Lightning talks
  Video: `https://www.youtube.com/watch?v=FTROCvmhXko`
  Jeffery begins 17:10-22:10, Title: "Apache Turbine isn't dead..."

- June 18, 2017, Drug Informatics Association (DIA) - 2017 Chicago II -"People Will Talk: Gathering Insights from Digital Listening" - A panel discussion on social media with leaders from FDA and EMA
  Program Details: `https://bit.ly/3fkSdbx`
  Video: `https://www.youtube.com/watch?v=mvzoIehe1EU` - 1hr 27min
  Jeffery speaks from 17:45 - 33:15

- 2014 - GSK/CCNC Collaboration interview
  Video: `https://www.youtube.com/watch?v=mjyqiGHR91M`

Professional Development

- Building and Solving Optimization Models with SAS/OR™
- Data Mining with WEKA, Offered by University of Waikato
- Vaadin Fundamentals and Vaadin Advanced training
- First Line Leader course for new managers at GlaxoSmithKline
- Sun Certified administrator for Solaris 2.6/8.x
- Oracle DBA training track

Awards

2023: GSK Ahead Together Award

○ GSK's top award for recognition in contributing to the company's mission of Ahead Together for Patients. This award is given to fewer than 1% of the entire company each year.

2022: GSK Gold Award

○ For deployment of the BEE App on Apple iOS for use by clinical investigators working on DREAMM (DRiving Excellence in Approaches to Multiple Myeloma) studies for data collection and quickly assess patient KVA scores. From concept to deployment in less than 6 months. The first GxP validated app deployed by GSK for clinical trials.

2021: GSK Silver Award

○ Developed eye calculator app to assist in DREAMM (DRiving Excellence in Approaches to Multiple Myeloma) studies for data collection and quickly assess patient KVA scores

2015: Global Medical Excellence Award - Gold Winner

○ *"Voice of the Patient: Project CRAWL - Contextualization of Real World Drug Use Through Social Listening"* The aim of this project is to deliver an automated, streamlined capability for using social media to enhance pharmacovigilance activities. The team delivered on several new Artificial Intelligence based capability enhancements to our safety organization, bringing the voice of the patient to the company.

2015: Global Medical Excellence Award - US Finalist

○ *"Voice of the Patient: Project Insight Explorer - Fueling faster medical insights through the use of text analytics."* The team led this innovative solution to improve synthesis and delivery of high quality insight for Voice of the Patient by replacing manual data processing with an automated process using artificial intelligence and advanced NLP/text analytics. This effort provided more robust and reliable insights in a timely manner to the matrix teams.

2015: GSK Bronze Award

○ *"Jeff's ability to work across boundaries to bring Insight Explorer to Canada will have significant impact on how Canada analyzes mVoC data. Without hesitation, Jeff stepped up to meet our needs and helped us navigate the IT process so we can utilize Medical Insight Explorer."* – Matthew Swash

2013: Exceptional Science Award

○ *"For developing computational tools for converting observational data for retrospective studies in Safety and Health Outcomes Research utilizing ontologies and high performance computing. Jeffery Painter is a key, highly regarded scientist in the area of high performance computing in observational data and has led and delivered projects for multiple teams throughout R&D."* – Alan Menius

2011: Exceptional Science Award

○ The Exceptional Science Award is given for outstanding contributions to research projects internally at GlaxoSmithKline. I was granted this award for my research into advancing the capabilities of automated ontology mapping through developing the use of a semantic measure of proximity.

Patents

Feb 8, 2022: Application Filed

○ Mitigating Ocular Toxicity: US Provisional Application No. 63/307,922. Inventors: Mala Talekar, MD & Jeffery L. Painter, Jr.

Aug 12, 2015: Application Filed

○ Electronically Predicting Corrective Options Based on a Sensed Physiological Characteristic. Inventors: Troy Trygstad, Jeffery L. Painter, Jr., and Alan Menius

Education

Georgia Institute of Technology   **Atlanta, GA**
MSc Computer Science, Concentration in HCI   *2021–2024*
GPA 4.0

NCCU School of Law   **Durham, NC**
JD, Concentration in Intellectual Property   *2011–2015*

NCSU   **Raleigh, NC**
Bachelor of Science, Applied Mathematics, Cum Laude   *2007–2009*

NCSU   **Raleigh, NC**
Bachelor of Science, Computer Science, Cum Laude   *2005–2007*
Statistics Minor & Cognitive Science Minor

Technology Skills

○ Developed **dfexpand**, an R package designed to simplify data frame manipulation by expanding columns for efficient analysis. Available on CRAN (dfexpand).
○ Primary Languages: Java (Lambdas and Streams), Python, LaTeX, XML/HTML, JavaScript
○ Secondary Languages: Perl, C/C++, x86 assembly
○ Statistics & Data Mining: DL4j, WEKA, R, JMP, SAS (EM, Visual Analytics, Text Miner)
○ Databases: MySQL, PostgreSQL, MS SQL Server, Oracle, Teradata, Apache HBase, Berkeley DB
○ Frameworks: Apache Turbine, Vaadin, Spring, d3.js, jQuery
○ Containers: Apache Tomcat, jetty, WebLogic
○ Build Tools: Maven, Ant, Eclipse, JRebel, JUnit, SVN, Git, jenkins
○ NLP: R tm, Python Textblob, Python nltk, Java OpenNLP, UMLS MetaThesaurus & MetaMap
○ Preferred environment: Ubuntu Linux, bash shell, R or Java and Eclipse
○ Legal tools: FindLaw, WestLaw Next and Lexis/Nexis

Publications

Jeffery's Google Scholar Profile

Highly Cited Papers

1. Minikel, E. V., Painter, J. L., Dong, C. C., & Nelson, M. R. (2024). Refining the impact of genetic evidence on clinical success. Nature, 1-6.

   https://www.nature.com/articles/s41586-024-07316-0.pdf

2. Nelson, M. R., Tipney, H., Painter, J. L., Shen, J., Nicoletti, P., Shen, Y., ... & Sanseau, P. (2015). The support of human genetic evidence for approved drug indications. Nature genetics, 47(8), 856-860.

   https://www.nature.com/articles/ng.3314

3. Reisinger, S. J., Ryan, P. B., O'Hara, D. J., Powell, G. E., Painter, J. L., Pattishall, E. N., & Morris, J. A. (2010). Development and evaluation of a common data model enabling active drug safety surveillance using disparate healthcare databases. Journal of the American Medical Informatics Association, 17(6), 652-662.

   https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3000752/

4. Powell, G. E., Seifert, H. A., Reblin, T., Burstein, P. J., Blowers, J., Menius, J. A., ... & Dasgupta, N. (2016). Social media listening for routine post-marketing safety surveillance. Drug safety, 39, 443-454.

   https://link.springer.com/article/10.1007/s40264-015-0385-6

5. Anderson, L. S., Bell, H. G., Gilbert, M., Davidson, J. E., Winter, C., Barratt, M. J., ... & Dasgupta, N. (2017). Using social listening data to monitor misuse and nonmedical use of bupropion: a content analysis. JMIR Public Health and Surveillance, 3(1), e6174.

   https://publichealth.jmir.org/2017/1/e6

6. Seabroke, S., Candore, G., Juhlin, K., Quarcoo, N., Wisniewski, A., Arani, R., ... & Slattery, J. (2016). Performance of stratified and subgrouped disproportionality analyses in spontaneous databases. Drug safety, 39, 355-364.

   https://link.springer.com/article/10.1007/s40264-015-0388-3

Recent Publications

1. Hakim, J. B., Painter, J. L., Ramcharran, D., Kara, V., Powell, G., Sobczak, P., ... & Beam, A. (2024). The Need for Guardrails with Large Language Models in Medical Safety-Critical Settings: An Artificial Intelligence Application in the Pharmacovigilance Ecosystem. arXiv preprint arXiv:2407.18322.

https://arxiv.org/pdf/2407.18322

2. Painter, J. Developing an R Shiny Interactive Module for Teaching Statistics to High School Students. July 2024

   http://dx.doi.org/10.13140/RG.2.2.28736.96005

3. Painter, J. L., Chalamalasetti, V. R., Kassekert, R., & Bate, A. (2024).Automating Pharmacovigilance Evidence Generation: Using Large Language Models to Produce Context-Aware SQL. arXiv preprint arXiv:2406.10690.

   https://arxiv.org/pdf/2406.10690

4. Painter, J. L., Mahaux, O., Vanini, M., Kara, V., Roshan, C., Karwowski, M., ... & Bate, A. (2023). Enhancing drug safety documentation search capabilities with Large Language Models: a user-centric approach. In International Conference on Computational Science and Computational Intelligence Proceedings.

   https://doi.org/10.1109/CSCI62032.2023.00015

5. Painter, J., Haguinet, F., Cranfield, C., & Bate, A. (2023). MSR20 NLP and Machine Learning to Automate Identification of Suspected Medication Errors from Real World Unstructured Narratives. Value in Health, 26(6), S281.

   https://doi.org/10.1016/j.jval.2023.03.1556

6. Talekar, M., Painter, J., Elizalde, M., Thomas, M., & Stein, H. Semi-Automation of Keratopathy Visual Acuity Grading of Corneal Events in Belantamab Mafodotin Clinical Trials: Clinical Decision Support Software. Frontiers in Digital Health, 5, 1138453.

   https://www.frontiersin.org/articles/10.3389/fdgth.2023.1138453/

7. Painter, J. L., Kassekert, R., & Bate, A. (2023). An industry perspective on the use of machine learning in drug and vaccine safety. Frontiers in Drug Safety and Regulation, 3, 1110498.

   https://www.frontiersin.org/articles/10.3389/fdsfr.2023.1110498/full

8. Painter, J. L., Girard, L., Glaser, M., & Bate, A. (2022, December). Leveraging Data Pathways for Next Generation Safety Monitoring of Medicines and Vaccines. In 2022 International Conference on Computational Science and Computational Intelligence (CSCI) (pp. 1570-1576). IEEE.

   https://american-cse.org/csci2022-ieee/pdfs/CSCI2022-2lPzsUSRQukMlxf8K2x89I/202800b578/202800b578.pdf

9. Powell, G., Kara, V., Painter, J. L., Schifano, L., Merico, E., & Bate, A. (2022). Engaging patients via online healthcare fora: Three pharmacovigilance use cases. Frontiers in Pharmacology,

13, 901355.

https://www.frontiersin.org/articles/10.3389/fphar.2022.901355/full

10. Pimenta, J. M., Painter, J. L., Gemzoe, K., Levy, R. A., Powell, M., Meizlik, P., & Powell, G. (2022). Identifying Barriers to Enrollment in Patient Pregnancy Registries: Building Evidence Through Crowdsourcing. JMIR Formative Research, 6(5), e30573.

https://formative.jmir.org/2022/5/e30573/

11. Kompa, B., Hakim, J. B., Palepu, A., Kompa, K. G., Smith, M., Bain, P. A., ... & Beam, A. L. (2022). Artificial intelligence based on machine learning in pharmacovigilance: a scoping review. Drug Safety, 45(5), 477-491.

https://link.springer.com/article/10.1007/s40264-022-01176-1

Additional Papers, Abstracts and Poster Presentations

1. Gartland, A., Bate, A., Painter, J. L., Casperson, T. A., & Powell, G. E. (2021). Developing crowdsourced training data sets for pharmacovigilance intelligent automation. Drug Safety, 44, 373-382.

https://link.springer.com/article/10.1007/s40264-020-01028-w

2. Gemzoe, K., Painter, J. L., Pimenta, J., & Powell, G. (2019, August). Crowdsourcing as a novel method to assess the impact of drug exposure on Belimumab pregnancy registry enrollment. In PHARMACOEPIDEMIOLOGY AND DRUG SAFETY (Vol. 28, pp. 436-436). 111 RIVER ST, HOBOKEN 07030-5774, NJ USA: WILEY.

https://javastats.com/publications/wiley-2019-abstract.pdf

3. Jeffery L. Painter, *A Day in the Life of a Data Scientist: Modeling the Impact of Subscriber Attrition with Variability*. Dec 13, 2017.

LinkedIn Article

4. Schifano, L., Powell, M., Clayton, L., Akhtar, A., Painter, J., Jan, D., ... & Simard, E. P. (2017, August). Discussions About Medication and Vaccine Use During Pregnancy and Lactation on Pregnancy Related Social Media Sites. In PHARMACOEPIDEMIOLOGY AND DRUG SAFETY (Vol. 26, pp. 511-512). 111 RIVER ST, HOBOKEN 07030-5774, NJ USA: WILEY.

5. Gartland, A., Akhtar, A., Le, R., & Powell, G. (2017). Leveraging Crowdsourcing to Help Classify Social Media Data for Medical and Patient Safety Insights. In AMIA.

Poster Presentation

6. Michele Thomas, Amy Curry, Jeffery L. Painter, Arhooj Akhtar, Lorrie Schifano, and Greg E.

Powell *Case Study: Computing Complexity Scores to Identify Patients of Interest from Inspire.com Forums for Safety and Beyond.* DIA Poster Presentation, Chicago, IL, June 20, 2017.

Poster Presentation

7. Jeffery L. Painter. *On the Perils and Pitfalls of PRR Analysis.* JSM, Chicago, IL, July, 2016.

   Poster Presentation

8. Yingzi Xu, Jeffery L. Painter. *Application of Classification and Clustering Methods on mVoC (Medical Voice of Customer) data for Scientific Engagement.* JSM, Chicago, IL, July, 2016.

   Poster Presentation

9. Casperson, T. A., Painter, J. L., & Dietrich, J. (2016). Strategies for distributed curation of social media data for safety and pharmacovigilance. In Proceedings of the International Conference on Data Science (ICDATA) (p. 118). The Steering Committee of The World Congress in Computer Science, Computer Engineering and Applied Computing (WorldComp).

   https://javastats.com/publications/gsk_worldcomp_2016.pdf

10. Michele Thomas, MBA, Bradley Turnbull, PhD, Jeffery L Painter, BS, JD, Rachael L DiSantostefano, PhD and Greg Powell, PharmD, MBA. *What are People Talking About? Medication Discussions on Social Media.* ICPE, Boston, August 25, 2015, Poster session.

    https://javastats.com/publications/ICPE_25Aug2015.ppt

11. Greg Powell, James Blowers, Heidi Bell, Michele Thomas, Jeffery Painter, JD, Nabarun Dasgupta. *Comparison of Events in Spontaneous Adverse Event Reports To Events Discussed Within Context of Drug Use on Facebook and Twitter.* ICPE, Boston, August 25, 2015, Poster session.

12. Rachael L DiSantostefano, Jeffery L. Painter, Michele Thomas and Greg Powell *Safety Assessment and Selection Bias: Who uses social media to communicate about medications?.* ICPE, Boston, August 25, 2015, Poster session.

    https://javastats.com/publications/Selection_Bias_ICPE.pptx

13. Parks, D., Lin, X., Painter, J. L., Cheng, J., Hunt, C. M., Spraggs, C. F., ... & Lee, K. R. (2013). A proposed modification to Hy's law and Edish criteria in oncology clinical trials using aggregated historical data. Pharmacoepidemiology and drug safety, 22(6), 571-578.

    https://onlinelibrary.wiley.com/doi/pdf/10.1002/pds.3405

14. Jeffery L. Painter and Greg Powell. *Performance of Observational Screening by System Organ Class.* Pharmacoepidemiology and Drug Safety, Vol. 21, ICPE 2012 Poster Presentation

15. Lin, X., Parks, D., Painter, J., Hunt, C. M., Stirnadel-Farrant, H. A., Cheng, J., ... & Lee, K. (2012). Validation of multivariate outlier detection analyses used to identify potential drug-induced liver injury in clinical trial populations. Drug safety, 35, 865-875.

    https://link.springer.com/article/10.1007/BF03261982

16. Cheng, J., Greshock, J., Painter, J., Lin, X., Lee, K., Zheng, S., & Menius, A. (2012). Predicting breast cancer chemotherapeutic response using a novel tool for microarray data analysis. Journal of Integrative Bioinformatics, 9(2), 80-87.

    https://pubmed.ncbi.nlm.nih.gov/22859439/

17. Painter, J. L. (2012). An Imaging Framework for the Analysis of Longitudinal High-Dimensional Data. In Proceedings of the International Conference on Image Processing, Computer Vision, and Pattern Recognition (IPCV) (p. 1). The Steering Committee of The World Congress in Computer Science, Computer Engineering and Applied Computing (WorldComp).

    http://worldcomp-proceedings.com/proc/p2012/IPC2996.pdf

18. Painter, J. L. (2011). Enhanced biomedical taxonomy mapping through use of a semantic measure of proximity. In Proceedings of the International Conference on Information and Knowledge Engineering (IKE) (p. 1). The Steering Committee of The World Congress in Computer Science, Computer Engineering and Applied Computing (WorldComp).

    http://worldcomp-proceedings.com/proc/p2011/IKE4750.pdf

19. Painter, J. L. (2011). Enhanced biomedical taxonomy mapping through use of a semantic measure of proximity. In Proceedings of the International Conference on Information and Knowledge Engineering (IKE) (p. 1). The Steering Committee of The World Congress in Computer Science, Computer Engineering and Applied Computing (WorldComp).

    http://worldcomp-proceedings.com/proc/p2011/IKE4750.pdf

20. Painter, J. (2010). Containing the Cloud: Security Issues in a Large Scale Observational Pharmacovigilance Research Project. Security and Management, 154, 1-7.

    https://javastats.com/publications/cloud.pdf

21. Painter, J. L. (2010). Toward automating an inference model on unstructured terminologies: Oxmis case study. In Advances in Computational Biology (pp. 645-651). Springer New York.

    https://javastats.com/publications/springer.pdf

22. Painter, J. L., & Flowers, N. L. (2009, July). Codeslinger: An interactive biomedical ontology browser. In Conference on Artificial Intelligence in Medicine in Europe (pp. 260-264).Verona, Italy, July 18-22, 2009: Springer, 2009.

https://link.springer.com/chapter/10.1007/978-3-642-02976-9_38

23. Merrill, G. H., Ryan, P. B., & Painter, J. L. (2008). Construction and annotation of a UMLS/SNOMED-based drug ontology for observational pharmacovigilance. Methods.

   https://javastats.com/publications/idamap.pdf

24. Ryan, P. B., Painter, J. L., & Merrill, G. H. (2008). Defining medical conditions by mapping ICD-9 to MedDRA: a systematic approach to integrating disparate observational data sources for enabling enhanced pharmacovigilance analyses. In Poster presented at the 44th Annual Drug Information Association Meeting, Boston, MA.

   Poster Presentation

25. Merrill, G. H., Ryan, P. B., & Painter, J. L. (2008). Using SNOMED to normalize and aggregate drug references in the Safetyworks observational pharmacovigilance project. KR-MED 2008, 126.

   KR-MED 2008 proceedings

26. J. L. Painter, *A Mapping Between SNOMED-CT and the OXMIS Coding Scheme*, KR-MED, Phoenix, AZ 2008, (Poster session.).

   Poster Presentation

27. Painter, J. L., Kleiner, K. M., & Merrill, G. H. (2006, October). Inter-translation of Biomedical Coding Schemes Using UMLS. In AAAI Fall Symposium: Semantic Web for Collaborative Knowledge Acquisition (pp. 110-111).

   https://cdn.aaai.org/Symposia/Fall/2006/FS-06-06/FS06-06-020.pdf