# TIN-X v2: modernized architecture with REST API for sustainability & interoperability

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Overview

- TIN-X = Target Importance and Novelty Explorer
- Bibliometric analytical method for prioritizing targets
- Data source: TCRD/Pharos
- *Prototype* developed into *product -- DevOps*
- Proposed informatics tools *exemplar*
- New architecture for *sustainability*
- New REST API for *interoperability*
- Version 2.0 released Feb 18, 2019
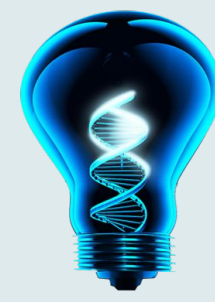
## NEW: REST API, Swagger powered, public

api.newdrugtargets.org

New Architecture, TIN-X Version 2.0 (newdrugtargets.org)
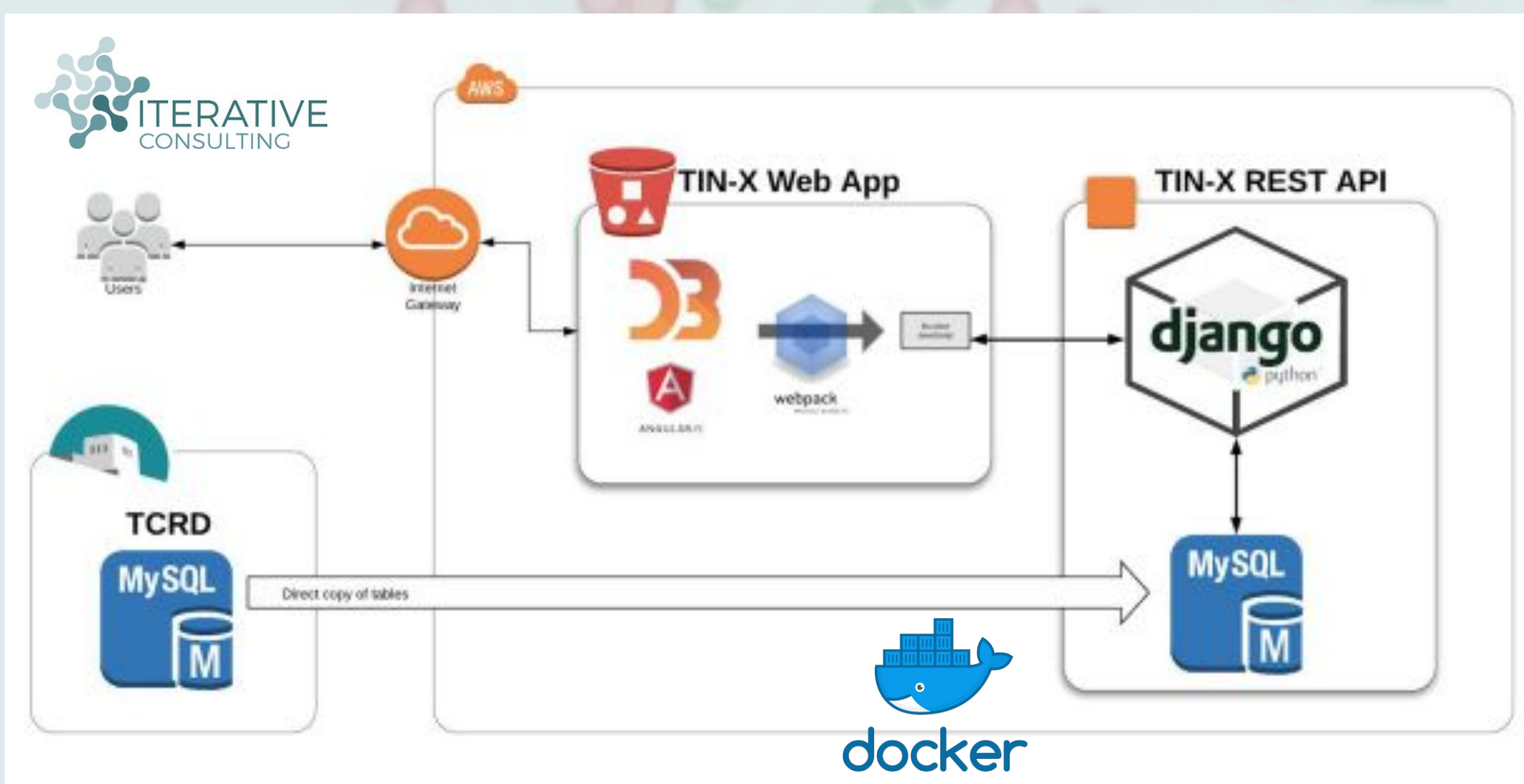
- Thin, modern, responsive web app
- Tighter TCRD integration via MySQL
- Better automated for faster PubMed updates
- Dockerized for rapid, flexible, economical deployment
- Design patterned for replication and reuse.

TIN-X v2 for Type 2 diabetes mellitus
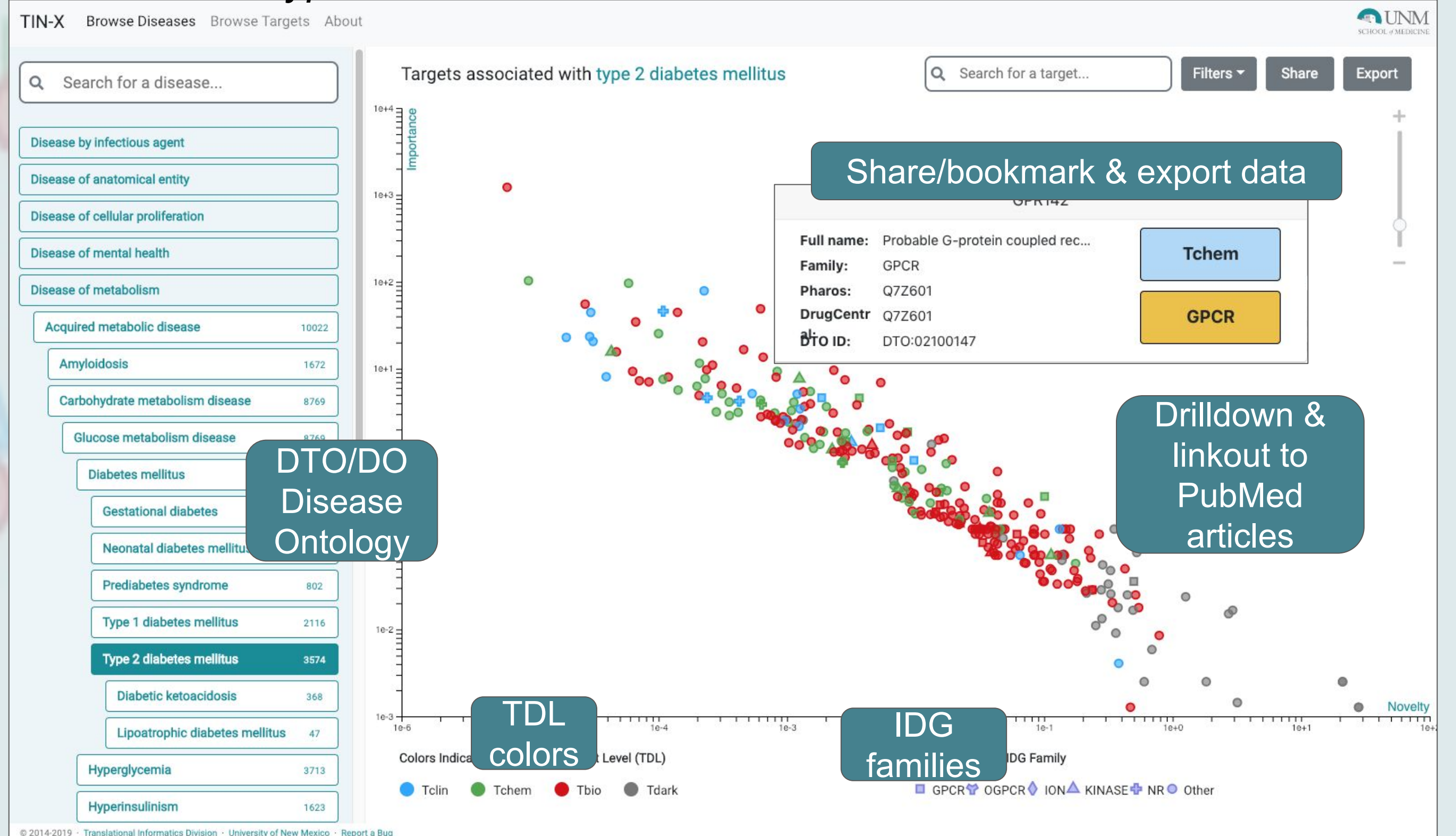
History, Background, Contributions

TIN-X is designed to prioritize and visualize associations between proteins and diseases, from scientific literature (PubMed) text mining by JensenLab, via TCRD, and organized by Drug Target Ontology (DTO) based disease and protein classifications. TIN-X was initially conceived and prototyped by Cristian Bologa, then engineered as a full stack webapp by Daniel Cannon, deployed via AWS. Motivated by its success and perceived value to researchers, TIN-X has been continually maintained, updated, and improved. Recently, TIN-X has undergone a major revision to version 2.0, designed and implemented by Iterative Consulting, LLC, co-founded by Daniel Cannon. The new architecture conforms to modern software engineering standards, includes a Swagger/Django REST API, D3 thin client, and tight integration with TCRD. Updates and deployment automation employs Docker and AWS (EC2, S3, CloudFront). Source code is managed via Bitbucket and GitHub. The improvements address the Resource Sharing Plan of KMC, and NIH policies and principles concerning digital resource sharing (e.g. FAIR) as emphasized by the NIH Strategic Plan for Data Science. Specifically, the new architecture

- Facilitates timely updates.
- Facilitates code support, maintenance, and further development.
- Facilitates clients with API access to TIN-X results.
- Provides transparency and reproducibility of workflow protocols.
- Serves as exemplar for IDG KMC based informatics and analytics tools.

In addition, the development and evolution of TIN-X from research prototype to enterprise component is a proposed DevOps design pattern.

TIN-X API Intro, via Jupyter, Google Colaboratory

References:

1. TIN-X: Target Importance and Novelty Explorer, DC Cannon, JJ Yang, SL Mathias, O Ursu, S Mani, A Waller, SC Schürer, LJ Jensen, LA Sklar, CG Bologa, TI Oprea, Bioinformatics, 2017, btx200, doi: 10.1093/bioinformatics/btx200.
2. NIH Strategic Plan for Data Science, https://grants.nih.gov/grants/rfi/NIH-Strategic-Plan-for-Data-Science.pdf.

IDG Face2Face, Feb 26-27, 2019, Arlington, VA