



PostgreSQL

NICAR CHICAGO 2018

ANTHONY DEBARROS • @ANTHONYDB

PostgreSQL: Intro

- Open-source Database Management System
- Closely follows ANSI-SQL standards
- Active for 20+ years; stable
- Strong software ecosystem, support
- Big data variants (Amazon Redshift, Citus)
- Data types for GIS (via PostGIS)
- Frequent choice for web app backends

PostgreSQL: Installing

- Windows Installers
 - EnterpriseDB.com
 - BigSQL: www.openscg.com/bigsql/
- macOS:
 - Postgres.app: postgresapp.com
- Linux
 - Distribution-specific

PostgreSQL: Managing

- pgAdmin: graphical UI
 - pgadmin.org
- psql: command-line tool
 - Included with PostgreSQL
- Numerous additional tools and add-ons
 - github.com/dhamaniasad/awesome-postgres/

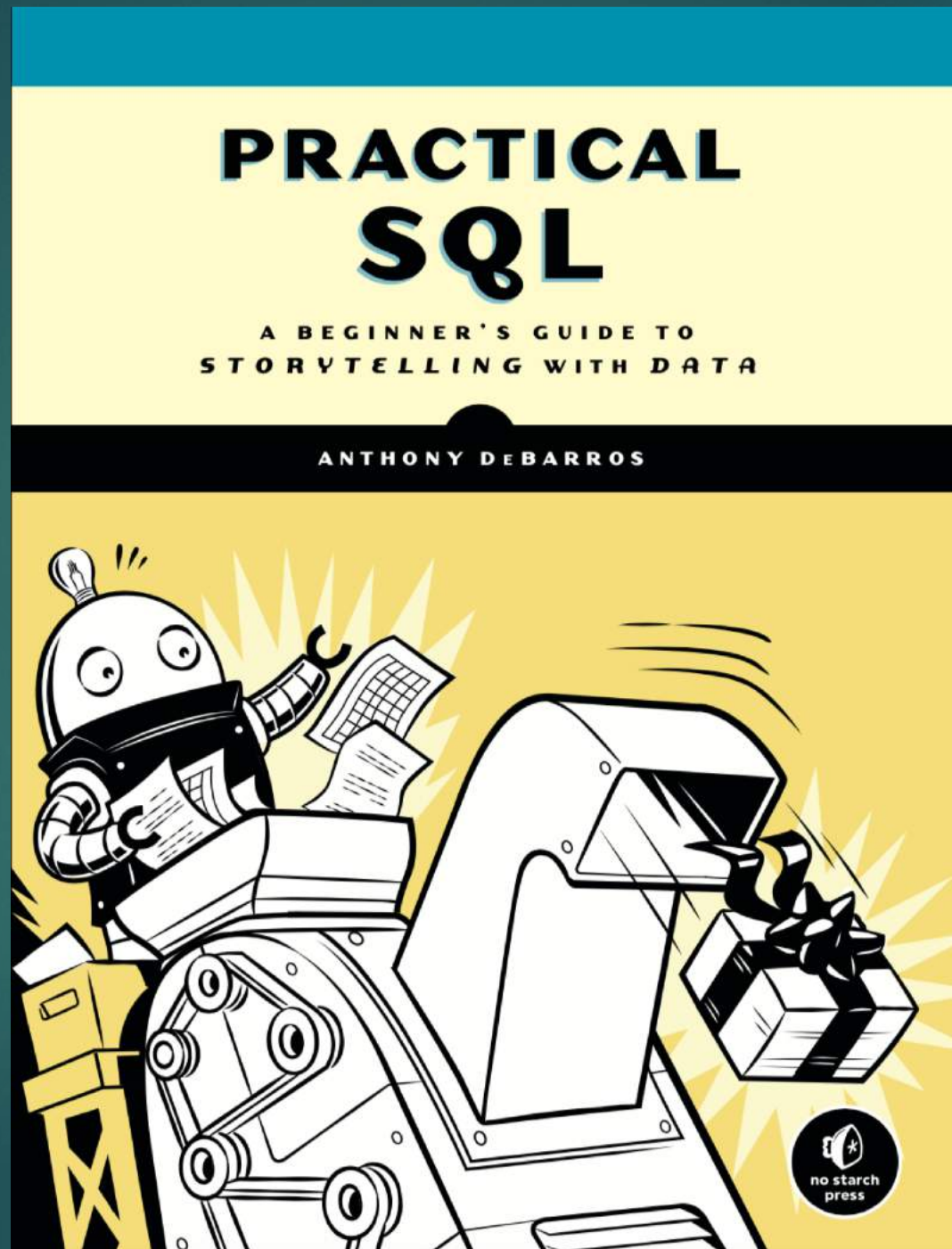
PostgreSQL: Hands-On



Today, we'll cover:

- pgAdmin and some basic queries
- Stats functions
- Spatial queries with PostGIS
- Full-text search
- Creating functions

Shameless
Plug ...



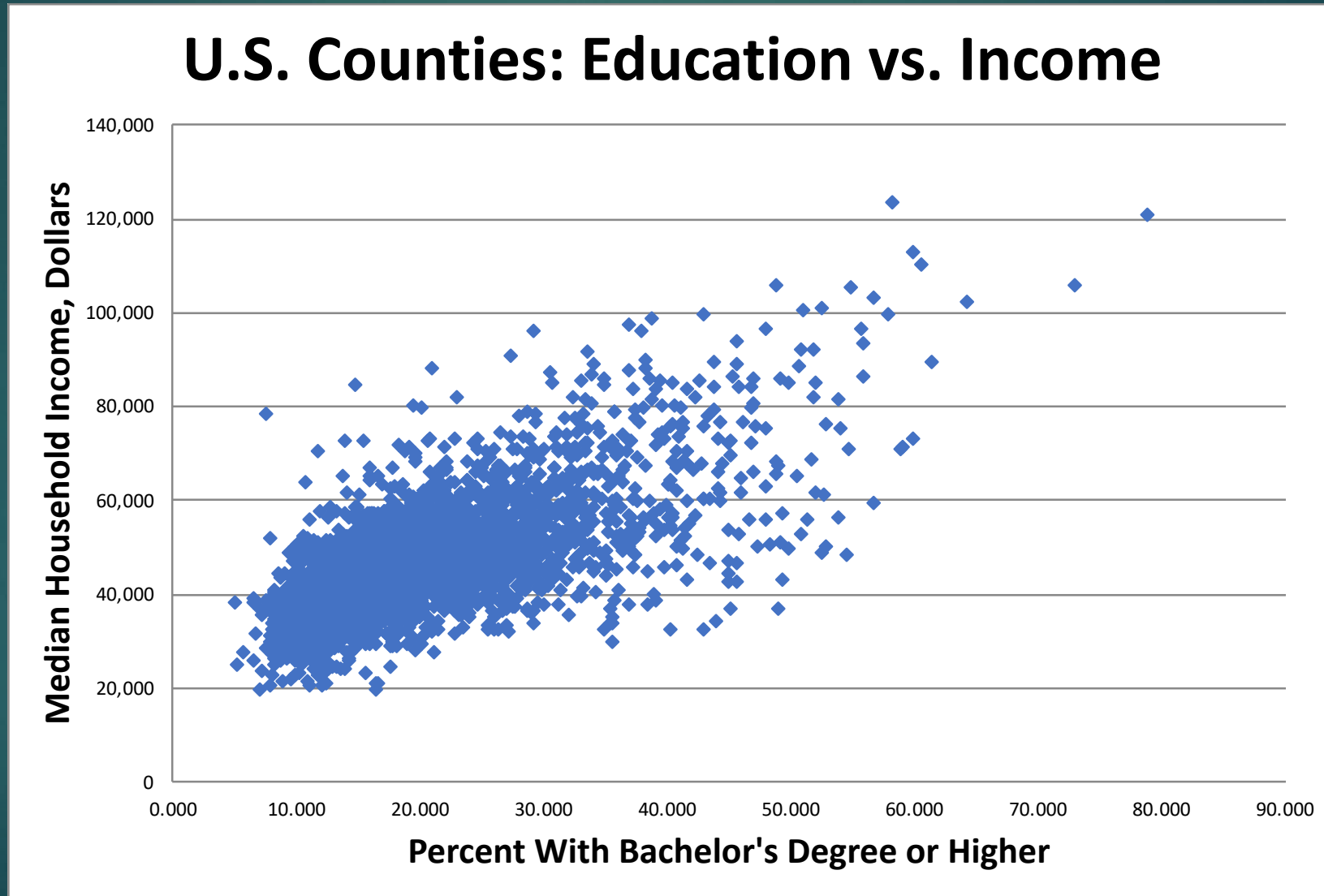
PostgreSQL: pgAdmin

The screenshot displays the pgAdmin 4 web interface. On the left, the 'Browser' pane shows a tree structure of database objects. The 'pg_demo' database is selected, and the 'Tables' object under the 'public' schema is highlighted. The main pane shows the 'Query' tab for the 'pg_demo' database. The SQL query executed is:

```
1 CREATE TABLE foo (  
2     foo_id bigint,  
3     foo_date timestamp with time zone NOT NULL,  
4     foo_text text  
5 );
```

The 'Data Output' tab is active, showing the result of the query: 'CREATE TABLE'. Below this, a message states: 'Query returned successfully in 44 msec.'

Stats: Finding Correlation Coefficient



PostgreSQL: PostGIS

Spatial data types and analysis

- <http://postgis.net/>
- Data types: geometry and geography
- <http://postgis.net/docs/manual-2.4/reference.html>

PostGIS Data Types

Installing PostGIS adds five data types to your database. The two data types we'll use in the exercises are geography and geometry. Both types can store spatial data, such as the points, lines, polygons, SRIDs, and so on you just learned about, but they have important distinctions:

geography A data type based on a sphere, using the round-earth coordinate system (longitude and latitude). All calculations occur on the globe, taking its curvature into account. That makes the math complicated and limits the number of functions available to work with the geography type. But because the Earth's curvature is factored in, calculations for distance are more precise; you should use the geography data type when handling data that spans large areas. Also, the results from calculations on the geography type will be expressed in meters.

geometry A data type based on a plane, using the Euclidean coordinate system. Calculations occur on straight lines as opposed to along the curvature of a sphere, making calculations for geographical distance less precise than with the geography data type; the results of calculations are expressed in units of whichever coordinate system you've designated.

PostgreSQL: Full-Text Search

Harry S. Truman

Message to the Congress on the State of the Union and on the Budget for 1946

1946-01-21

To the Congress of the United States:

A quarter century ago the Congress decided that it could no longer consider the financial programs of the various departments on a piecemeal basis. Instead it has called on the President to present a comprehensive Executive Budget. The Congress has shown its satisfaction with that method by extending the budget system and tightening its controls. The bigger and more complex the Federal Program, the more necessary it is for the Chief Executive to submit a single budget for action by the Congress.

At the same time, it is clear that the budgetary program and the general program of the Government are actually inseparable. The President bears the responsibility for recommending to the Congress a comprehensive set of proposals on all Government activities and their financing. In formulating policies, as in preparing budgetary estimates, the Nation and the Congress have the right to expect the President to adjust and coordinate the views of the various departments and agencies to form a unified program. And that program requires consideration in connection with the Budget, which is the annual work program of the Government.

PostgreSQL: Full-Text Search

- ts_vector and ts_query data types
- Lexemes
- Operators