



It's as Easy As SASPy to Combine SAS[®] and Python in Teaching the Data Sciences

James Harroun

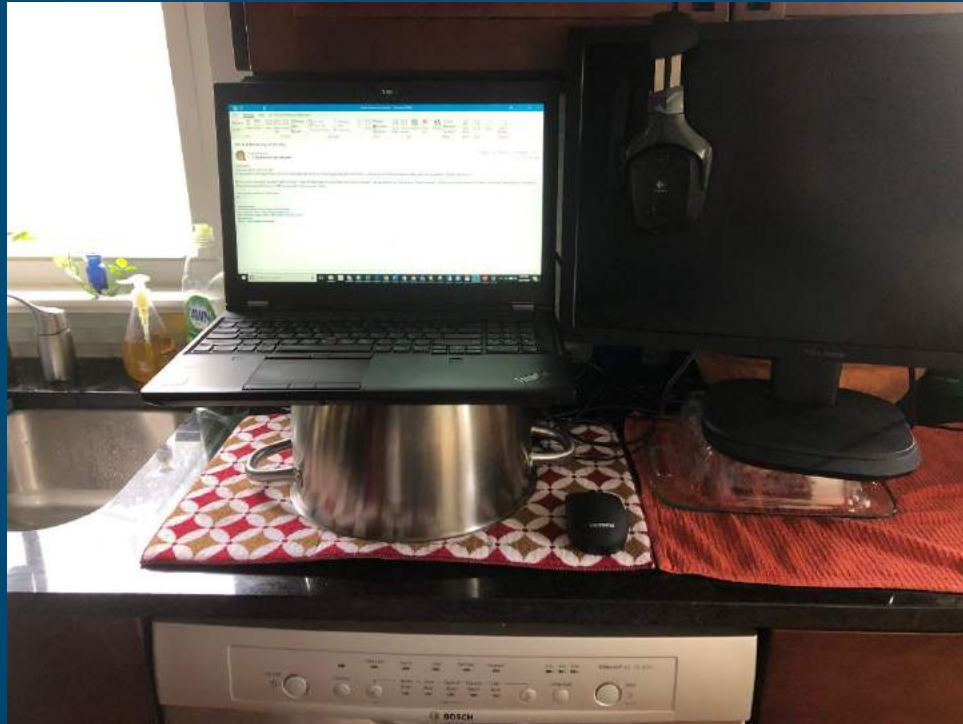
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Broadcasting from My Kitchen Office



Our Mission:



The **SAS Global Academic Program** supports industry partnerships with academia, delivers technology and resources for teaching and learning, and provides products and services at no cost to schools.

Our “customers” are students, educators, independent learners, and academic researchers.

Global Academic Program Goals



Increase SAS Consideration
and Adoption Among Faculty



Build SAS Skill and Usage
Among Students



Develop Academic-
Commercial Connections

Free Training for Educators

Register Today!

You can select from:

- Online Live Training
- In-Person Training

www.sas.com/professor-workshops

Global Academic Program Workshops

Bring the Power of Analytics to the Classroom for FREE

Live Web Workshops ▶

Upcoming Classroom Workshops ▶

We're excited to help you bring the power of analytics to your classroom! Register for a free Professor Workshop in three easy steps.

- 1 Determine your preferred location and the track that interests you and add it to your cart.
- 2 Provide your information as student (or sign in with your SAS Profile).
- 3 Follow the simple check-out process.

Interested in more than one workshop? No problem. Feel free to advance your SAS knowledge by signing up for additional workshops. Simply use your browser's back button to ensure you return to the Professor Workshops offerings page.

Workshops offerings page

Educator and Student Training

Sample Full Workshops | 2019

Foundational Courses

- Data Manipulation and Analytics Using SAS University Edition
- SAS Programming I and SAS Programming II
- SAS SQL: Essentials
- SAS Visual Analytics on SAS Viya

Statistical Courses

- SAS Visual Statistics
- Multilevel Modeling of Hierarchical and Longitudinal Data Using SAS

Advanced Analytics

- Applied Analytics Using SAS Enterprise Miner
- Text Analytics Using SAS Text Miner
- SAS Visual Data Mining and Machine Learning on Viya: Interactive Machine Learning

Free SAS Learning Resources for Academics

Check It Out Today!

You can now get access to free e-Learning and trainer's kits online. Go to:

www.sas.com/academic-hub

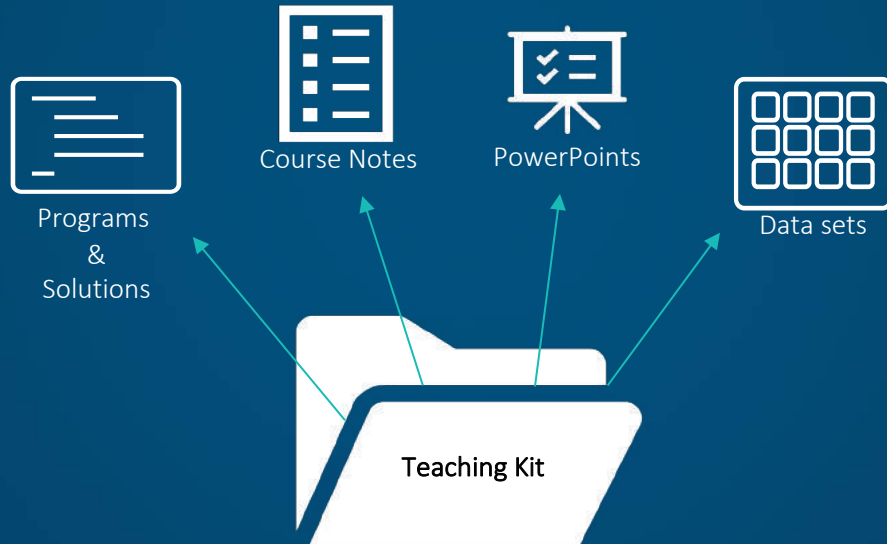
The screenshot shows the SAS Academic Programs website. At the top, there is a navigation bar with "SAS Academic Programs" on the left and "Overview", "Software", and "Resources" on the right. The main heading is "Free SAS E-Learning for Academics", followed by the subtext "With online courses and teaching materials from SAS, you can achieve your goals - at your own pace." Below this is a large image of people in a classroom setting. A quote is overlaid on the image: "There is a 37% annual increase in demand for data scientists and related technical positions today." Below the quote is the source: "LinkedIn US Emerging Jobs Report". At the bottom of the image, there are two buttons: "For Educators" with a teacher icon and "For Students" with a student icon.

For Educators

For Students

Academic Access to SAS Teaching Kits

What's Included



Support for Educators and Learners



Academic Programs

SAS Specialization Programs
Academic Badging



Education Resources

Academic Workshops/SAS Days
Teaching Materials
e-Learning
e-Textbooks
Tutorials
Curriculum Consulting
Guest Speakers



SAS Software Promotion

SAS OnDemand for Academics
SAS Viya for Learners
SAS University Edition

Free SAS Software for Academics

FREE

SAS® OnDemand for Academics

Access statistical analysis, data mining and forecasting software.



EDUCATOR



Why choose SAS® OnDemand for Academics?




FREE


NEW!

SAS® Viya® for Learners


Build data science skills with our cloud-enabled, open analytics engine.



EDUCATOR







Why choose SAS® Viya® for Learners?




FREE

SAS® University Edition


Teach or learn SAS skills using SAS foundational technologies.



STUDENT EDUCATOR RESEARCH LEARNER



Why choose SAS® University Edition?





Analytics Moves the World: Start Small and Think Big



Analytics Moves the World:
Start Small and Think Big

Analytics Moves the World:
How to Win the Indianapolis 500
& Reduce Your Carbon Footprint

Analytics Moves the World: 2020



James Harroun's current commute and his stable of winning vehicles: 1997 Mercedes-Benz E320 and 2015 Nissan Versa



Which Side of the Fence Are YOU on?



- Multiple technologies: multiple strengths
- Current versions of SAS provide multiple integration points to popular open source software
- Allows users to code in the language(s) of their choice

Demonstration of SAS Studio and Jupyter Lab

The screenshot displays the SAS Studio web interface. On the left, a 'Server Files and Folders' pane shows a directory structure including folders like 'gasas38', 'GASCBD_003_data', 'GASUE34', and 'INPDIRMS'. The main area shows a code editor for 'mileage.sas'. The code includes comments, directory creation, and data input from a file named 'DATALINES'. A preview of the data is shown at the bottom of the editor.

```
1 /* ***** */
2 /* program mileage.sas */
3 /* program to capture measured new car gasoline use and co2 impact and compare to predicted old car values*/
4 /* first created 11 march 2016 */
5 /* james harroun, data science initiatives manager, sss global academic program */
6 /* james.harroun@sas.com */
7 /* ***** */
8
9 OPTIONS DLCREATEDIR;
10
11 LIBNAME gas "/folders/myfolders/gas_receipts";
12
13 *
14 create data set mileage_001 to capture gasoline purchase receipt data and odometer data
15 ;
16
17
18 DATA gas.mileage_001;
19   INFILE DATALINES;
20   INPUT date :DATE. price gal mi;
21   DATALINES;
22 30APR2015 2.449 9.864 401.4
23 04MAY2015 2.449 7.338 307.5
24 07MAY2015 2.569 9.758 397.0
25 *****
#folders/myfolders/gas_receipts/mileage.sas
```

Line 2, Column 26 UTF-8
Messages: 2 User: sasdemo

Demonstration of SAS Studio and Jupyter Lab

The image shows a screenshot of a web browser displaying two applications: SAS Studio and Jupyter Lab. The SAS Studio interface is visible in the background, showing a file explorer on the left and a code editor in the center. The Jupyter Lab interface is overlaid on top, showing a notebook titled "milaage_sas_notebook.ipynb". The notebook content includes a title, a scenario description, and instructions for creating a data set and using SAS code.

An Example Jupyter Notebook Using the SAS Kernel and SAS Syntax

Scenario: A commuter is interested in analyzing whether purchasing a new car will reduce her Carbon Dioxide (CO₂) emissions.

You will be provided with gasoline receipt data and SAS programs to derive new measurements

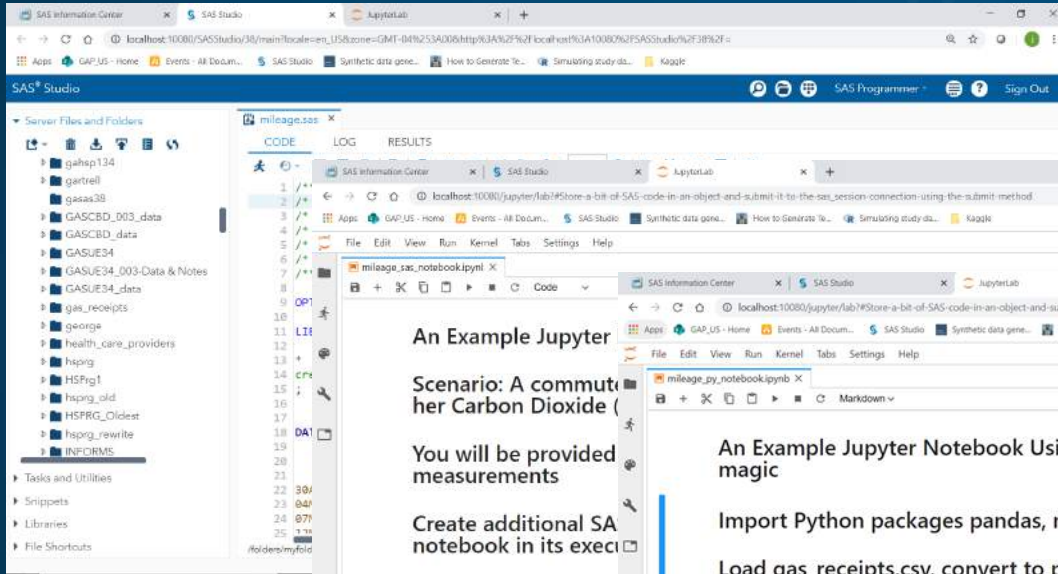
Create additional SAS code cells to answer the prompts and generate output. Save your notebook in its executed state.

Create data set gas.mileage_001:

Gasoline receipt data is contained in the DATALINES statement

```
date: date of gasoline purchase
price: price paid per gallon of gasoline
```


Demonstration of SAS Studio and Jupyter Lab



SAS® Studio

Server Files and Folders

- gahep134
- gartrell
- gasas38
- GASCBDD_003_data
- GASCBDD_data
- GASJUE34
- GASJUE34-Data & Notes
- GASJUE34_data
- gas_receipts
- george
- health_care_providers
- hsprig
- HSFRG1
- hsprig_old
- HSFRG_Oldtest
- hsprig_rewrite
- INFORMS

Tasks and Utilities

- Snippets
- Libraries
- File Shortcuts

folders/myfold

An Example Jupyter Scenario: A commuter her Carbon Dioxide (CO₂) emissions.

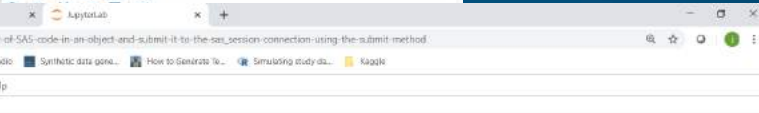
You will be provided measurements

Create additional SAS notebook in its execution

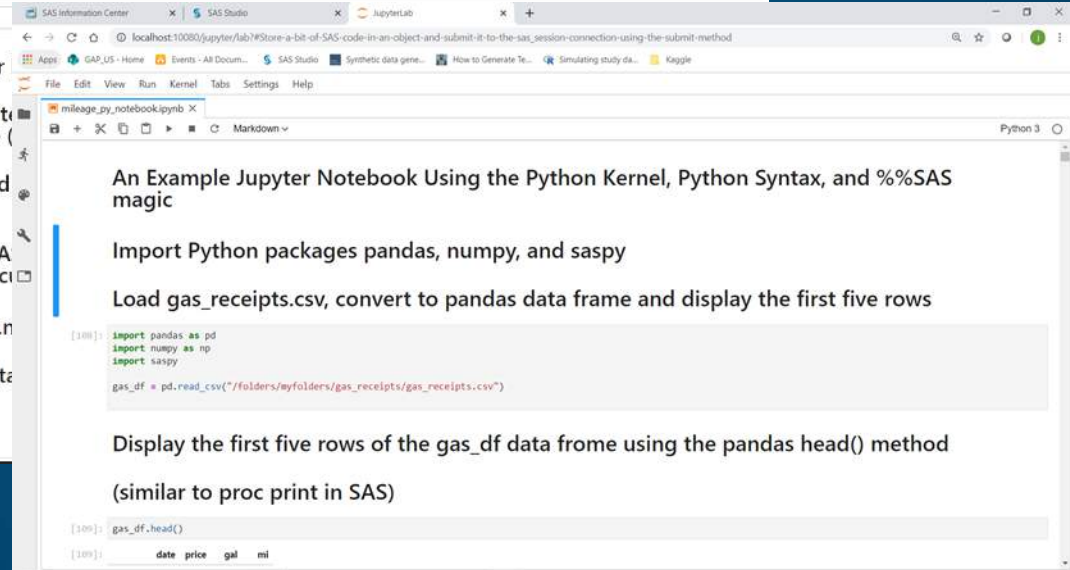
Create data set gas_receipts

Gasoline receipt data

date: date of gasoline purchase
price: price paid per gallon of gasoline



```
1 / **
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```



An Example Jupyter Notebook Using the Python Kernel, Python Syntax, and %%SAS magic

Import Python packages pandas, numpy, and saspy

Load gas_receipts.csv, convert to pandas data frame and display the first five rows

```
[108]: import pandas as pd
import numpy as np
import saspy

gas_df = pd.read_csv("../folders/myfolders/gas_receipts/gas_receipts.csv")
```

Display the first five rows of the gas_df data frame using the pandas head() method (similar to proc print in SAS)

```
[109]: gas_df.head()

[109]:    date price gal mi
```

Demonstration of SAS Studio and Jupyter Lab

Python Integration preconfigured in the following environments:

SAS University Edition

SAS Viya for Learners

sas_kernel and saspy packages can be configured for:

Local SAS installations

SAS OnDemand for Academics (coming soon)

For more information, Please visit the following:

<https://sassoftware.github.io/saspy/>

https://sassoftware.github.io/sas_kernel/

Thanks for Attending!

Please take our quick survey!

<http://tinyurl.com/PostSurveySAS>

Event ID: 575821-01

Thank you!

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sas.com/academic