

# Dash: An Easy-to-Use Framework for Building Web Applications and Dashboards\*

Conference Workshop

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This workshop will introduce Dash, an open-source framework that enables rapid development of Python web applications [1]. Dash has recently been gaining popularity as a tool for building professional-quality data visualization dashboards; however, because it includes a full range of user interface components (buttons, dropdown menus, sliders, canvases, etc.) it can also be used to build almost any kind of web-based application. Dash applications generate HTML and React.js, though because of the low-code design approach, no knowledge of these is necessary; and very little code is needed to get up and running. Furthermore, callback functions are designated using intuitive function decorators which make it easy to see exactly what should trigger a callback to run and what should be changed as a result. All of this makes it an accessible option for CS1/2 students being introduced to graphical user interfaces. Furthermore, Dash integrates seamlessly with the Plotly data visualization library [4], and so it is an excellent opportunity to introduce data science use cases in early programming courses. There are also many options for students to deploy and share their Dash applications, including some free and easy to use services like Heroku [3] and Python Anywhere [5], because it sits on top of a Flask web server [2], which is a widely supported Python web framework.

As part of the workshop, we will cover

- building applications with basic UI components

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- writing callback functions, including those with multiple triggers and outputs as well as chained callbacks
- integrating Plotly graphs and maps into Dash applications
- a discussion of considerations necessary to deploy applications publicly on the web

## References

- [1] Dash python user guide. <https://dash.plotly.com/>.
- [2] Flask: web development one drop at a time. <https://flask.palletsprojects.com>.
- [3] Heroku cloud application platform. <https://www.heroku.com/>.
- [4] Plotly open source graphing library for python. <https://plotly.com/python/>.
- [5] Python anywhere. <https://www.pythonanywhere.com>.