# Steve McNutt

## Who are you?

Volcano-seismologist.

## How did you get here?

Got a scholarship from his Dad’s company, paid his way to nice schools. Did a volcanology course in his last year of undergrad. Did a project on volcanic earthquakes. Then got PhD at Lamont switched on to the Alaska project studying Pavlof, as someone else rotated out. Made a tape recording on sonic booms from Concorde that connected him to infrasound people. Then got a job at California state geological survey. 7 years. Focus on Long Valley. Alaska has 2 eruptions per year. Hired to UAF in 1991. Nanooks, musk ox, adjustment to lifestyle. ½ time paid by AVO. Aviation ash hazard drove his appointment. Then money ran out, family of 4 to support, moved to Florida.

## What do you do?

95% of air freight from North America to Asia goes over Alaskan volcanoes. Seismic instruments on 6 volcanoes. Expanded to 30 volcanoes by 2005. Collect as much data as possible. Good monitoring leads to good science. You have to make the call in real-time, based on simple analysis. He claims he was at a meeting of 100 people (seismologists) and only 5 worked on volcano seismology. (That must have been a long time ago!). Instrument placement, need line of sight, lots of batteries, last 1-10 years.

Rocket seismology. Nicaragua, Caribbean. But he isn’t mentioning me at all. Talking about the calibration testing I did. Nozzle. SpaceX explosion. Rocket fuel has high energy density. Strongest signal being 30 degrees off. Claims this as his research.

Quarry blasts. 6 instruments. Seismic, infrasound, lightning – they are all waves. Upside-down seismology at the speed of light.

# Mel Rodgers

## Who are you?

Volcanologist and geophysicist.

## How did you get here?

Pyrenees trip at 17 with air cadets. Learned to fly before drive. Durham undergrad for geology. Colima internship with Nick Varley. Dyslexia and inferiority complex.

## What do you do?

# Meghan Cook

## How did you get here?

Project documenting eruptions during semester. HVO volunteer doing cospec. National Park Service in Delaware, 6 months. Volcanic geochemistry on rocks with Jeff Ryan, Masters then PhD. Was losing her way as PhD student, wanting a family (3 kids now, including a pandemic baby called Glen?) and a job, not really compatible with the system. Wow, geology is less diverse than physics, computer science and engineering? Just finished her PhD. Job in library.

# Matt Pasek

# Glenn

## Who are you?

A physicist and computer scientist who works on geohazards and space hazards. I particular work with seismic and infrasound data to better monitor volcanoes. Not a geologist, chemist or biologist, though I’ve been interested in fossils and rocks since I was a little kid.

## How did you get here?

In high school, I got really into amateur astronomy. REALLY into it! So I wanted to do it professionally. But nobody in my family had ever stayed in school beyond age 16, so I had no role models, and only about 5% of my school went on to college. So I’ve never really known how to chart an academic career (still). On TV I just saw cool documentaries of astronomers working at observatories in exotic places, often isolated high in the mountains. Nothing about writing proposals & papers and going to conferences and service. I never saw scientists as guys in white lab coats. I was seeing people like Patrick Moore and Heather Couper, the UK equivalent of Neil deGrasse Tyson and Carl Sagan. So I pictured a life going from one astronomical observatory to another.

I went to St. Andrews University in Scotland, because it had the best astronomical observatory, and it was small, like the village I grew up in. I didn’t want to be in a big city. I struggled with homesickness that first semester and always quit, but after that, loved it. The first time I thought about research was upon meeting Eric Priest, a professor in solar physics, who said research is just coming in to work to play every day. That led to my undergrad project in solar physics – a connection that is now coming full circle – and I got to work at CERN for the summer, which was mind-blowing.

Next I wanted to work on space or planetary physics. I got an offer from Imperial College, but it got lost in the mail. I got offered a PhD on Martian volcanoes, which I really wanted to do, but there was no funding and I couldn’t afford that. That got me thinking about volcanoes for the first time, professionally. There was a really cool project advertised at Leeds which stated “the student will gain field experience in Italy, New Zealand and Bali”. I knew I had no chance of that – I had no geology background. But I met the professor over a cup of tea, and he said he was looking for a theoretical physicist. So I applied and next time I saw that professor was arriving on an overnight ferry at 5am in Stromboli, the lighthouse of the Mediterranean. Day one of my PhD was hiking up an active volcano and watching explosions every 5 minutes!

But what changed everything for me was that at the beginning of my PhD, on my 24th birthday, the Soufriere Hills Volcano on Montserrat erupted. This tiny island in the Eastern Caribbean is one of the last vestiges of the British Empire, and now it was up to Britain to help out with the eruption. The British Geological Survey wasn’t like the USGS – it didn’t have permanent volcano observatories or even a volcano team – so they reached out to all the university volcanology professors and their grad students. So I got involved with the eruption, and it blew my mind! Within minutes of arriving, I was in a helicopter for the first time, without doors – or functioning seatbelts – observing a growing lava dome, with rockfalls continuously occurring. I was in the field with experts, and in meetings with them and the Governor and Chief Minister. And the biggest revelation was that my opinion counted. Everybody’s did, regardless of race or gender. This was truly a mixed team. I didn’t have the volcanological background, but volcano monitoring is as much about pattern recognition as anything else. I was on the seismic monitoring team, and seismic monitoring was by far the most informative technique. We have VTs, LPs, hybrids, swarms, tremor, banded tremor, rockfalls, pyroclastic flows, explosions, lahars – and the temporal (and spatial) patterns of these signals was the biggest clue as to what the volcano might do next. The other key technique, of course, was observing and measuring the dome growth and collapse, but that could only be done periodically, not continuously. I began to realize pretty quickly that the best area I could contribute was to build software to detect and quantify all these different seismicity patterns. I had to go back to Leeds and my PhD studies, but now my goal was to work at volcano observatories.

Two years later, Steve McNutt was looking for a postdoc at the Alaska Volcano Observatory in Fairbanks. It wasn’t a traditional postdoc. The goal was to build the first web-based seismic monitoring system for volcanoes. So it was more of a software engineering exercise than academic research. It was ideal for me. The core of that software is still being used today at several observatories, including AVO.

Then MVO – the observatory in Montserrat – was looking for a Seismic Network Manager and Deputy Director. The eruption had restarted, and systems had fallen into ruin after a 20-month pause in activity and corresponding drop in funding and staffing. So we had to rapidly rebuild and then take the monitoring to new levels. This was ike building the plane while flying it. I could write a book about the 4 years I spent out there.

In 2006, I returned to Alaska and worked mostly for AVO but also for the Alaska Earthquake Center, mainly as a software developer. After 7 years there, funding was running low. Steve had moved a year earlier to USF, and had been encouraging me to join him and help build a seismology research group. The idea of moving from Alaska to Florida was not so appealing, neither was moving from a cool frontier town to a huge city, but it seemed a good time to move from observatory operations to an academic job, so I could begin publishing the innovative things I had done, and develop them further. It was daunting though.

## What do you do?

I focus primarily on using seismic and infrasound data to understand – and help monitor – volcanic hazards. Explain precursors, alarm systems & early warning systems.

Rocket Seismology.

Discuss New Zealand project.

Two transformative experiences. Contrast AVO and MVO monitoring. Continuous eruption. Living on the volcano, not 1000 miles away. How I really lived in Alaska. Not cheating with the big house, heated garage, autostart. Cycling or skiing to work throughout winter. Living in a cabin. Peeing outside.