Low-Cost Sampling of Cocci Fungus

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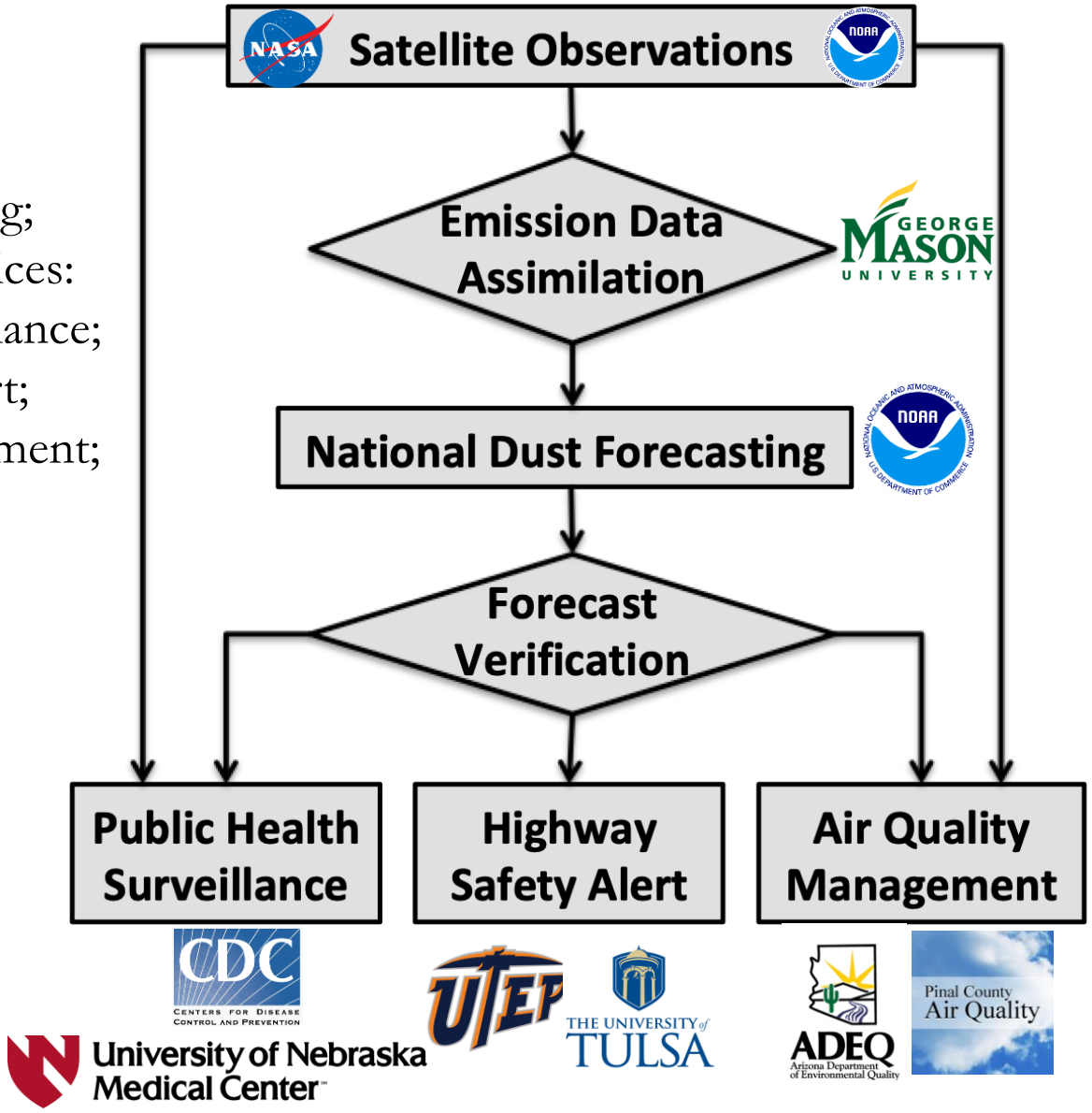
Arizona Dust Workshop, Coolidge, AZ
March 3, 2020

Satellite-aided Dust Forecasting

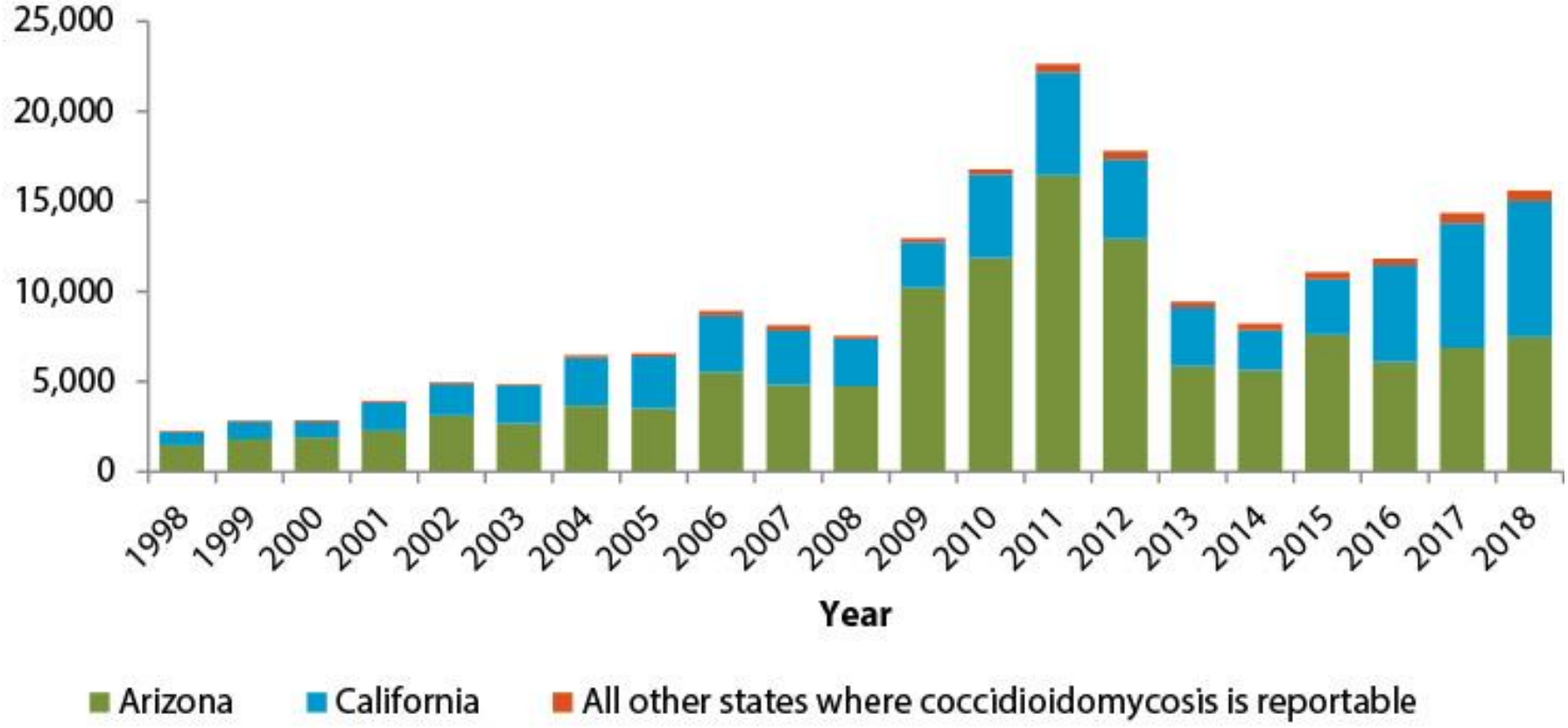
Project Goals:

1. Improve dust forecasting;
2. Support three dust services:
   a) Valley fever surveillance;
   b) Highway safety alert;
   c) Air quality management;



Burden of Disease

(Contributed by Orion McCotter)

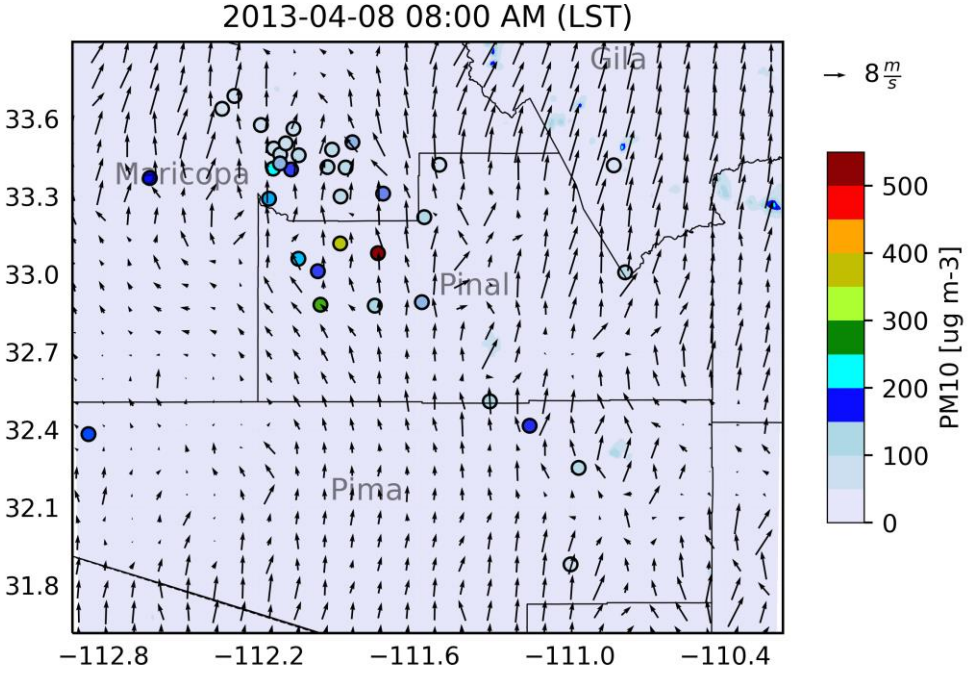


(https://www.cdc.gov/fungal/diseases/coccidioidomycosis/statistics.html)

- 4000 deaths caused by Valley Fever;

Can We Forecast Cocci in the Air?

(Contributed by Janak Joshi)



Dust Storms in Sacaton, AZ (July 5, 2011).
Photo by NOAA/NWS/Grace Watson

"Whatever is of the right size, in the right place, at the right time, can be part of the 'dust' available to be inhaled by someone" -- William Sprigg, 2017

Detecting Cocci in the Air

HHS Public Access
Author manuscript
Med Mycol. Author manuscript; available in PMC 2017 August 01.

Published in final edited form as:
Med Mycol. 2016 August 1; 54(6): 584–592. doi:10.1093/mmy/myw022.

Molecular detection of airborne *Coccidioides* in Tucson, Arizona

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(Source: hi-q.net)

Large-volume air sampler

Can low-cost samplers be used to detect Cocci in the air?

Low-Cost Air Samplers

(Contributed by Zack Chester)

Marble Dust Collector (MDCO)

Requirements:

1) None for power or WiFi;
2) Monthly sample collection

PurpleAir Air Quality Sensor

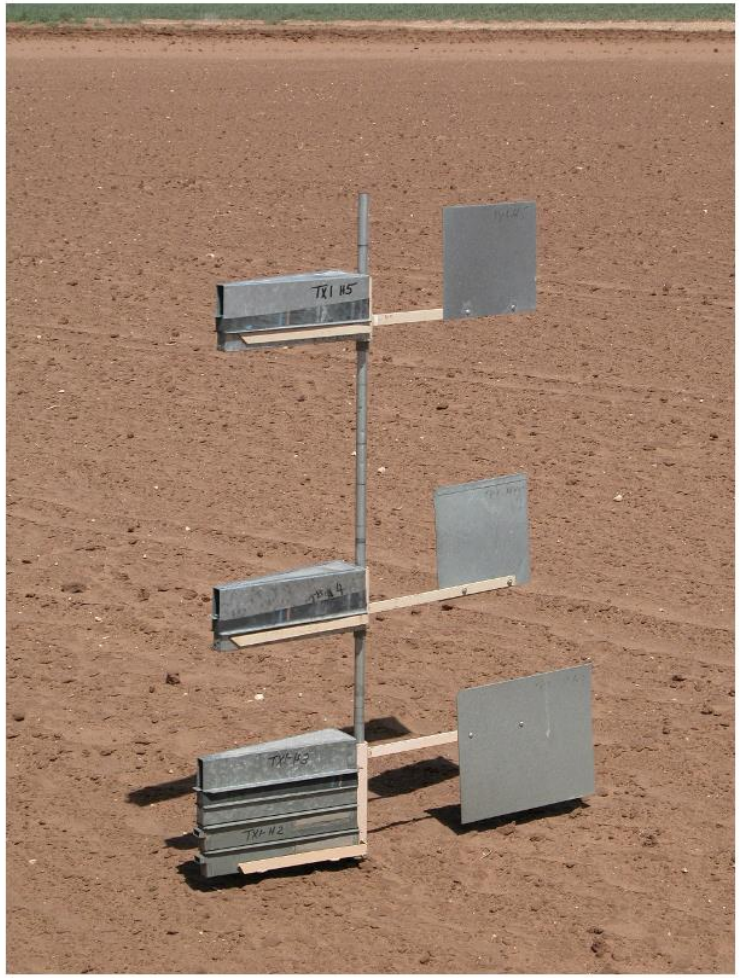
Requirements:

1) Need power;
2) Need WiFi

Low-Cost Air Samplers

(Contributed by Scott Van Pelt)

Big Spring Number Eight (BSNE)



Requirements:

1) None for power or WiFi;
2) Monthly sample collection

Aspirated Air Sampler

Requirements:

1) Need power;
2) Change Filters;

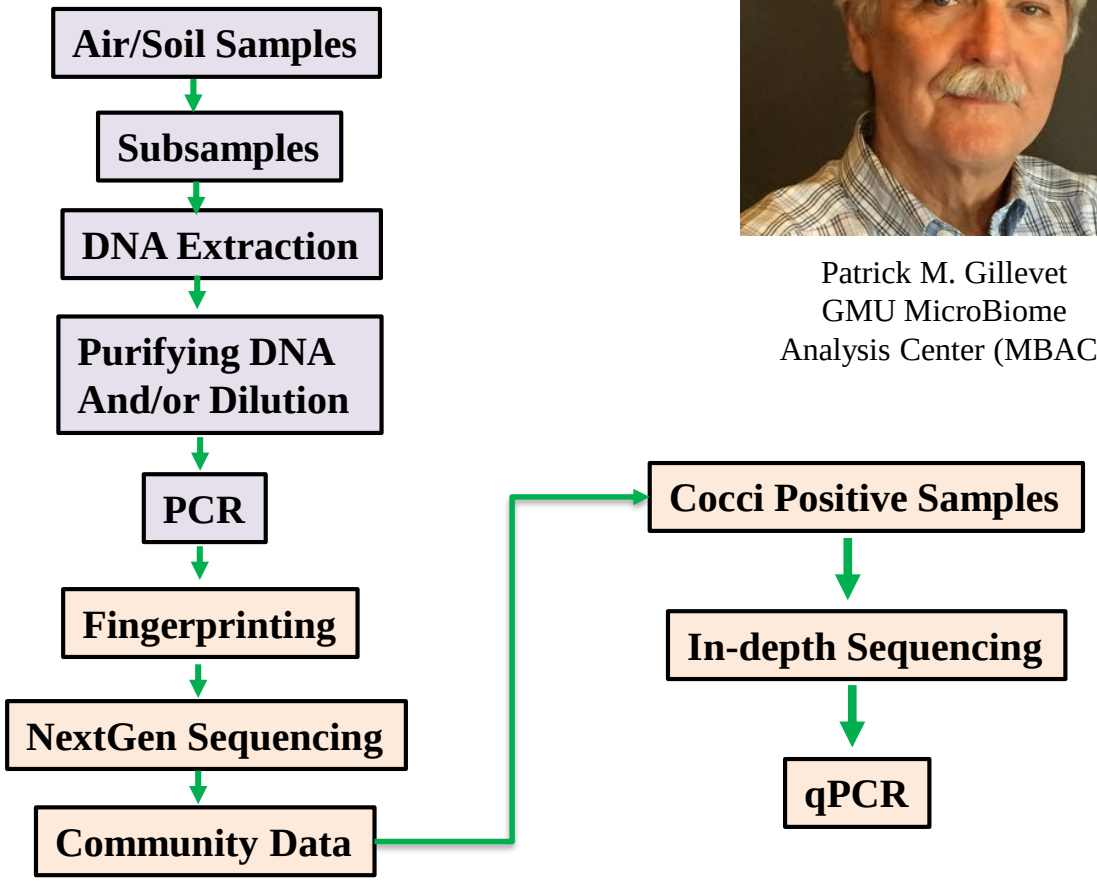
Laboratory Analysis

(Contributed by Ling Ren)

- Multitag sequencing of bacterial and fungal communities
- Detection and real-time PCR on *Coccidioides*

DNA extraction

NextGen Sequencing



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Summary

Experiments with low-cost air sampling

- 4-5 air/sediment samplers/sensors;
- Low cost → Easy to scale up;
- Long-term monitoring → Seasonality;
- Low maintenance/operational cost;

Looking for collaborations:

- To host a sampling site with Marble Dust Collector or other samplers;
- To suggest/supply other samplers/methods/analysis;

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