The USC-Buck Nathan Shock Center of Excellence in Research in the Biology of Aging

Town Hall - May 21, 2021

Administrative/Program Enrichment Core – Sean Curran/Gordon Lithgow

Geroscience Technology Core – Valter Longo/Simon Melov

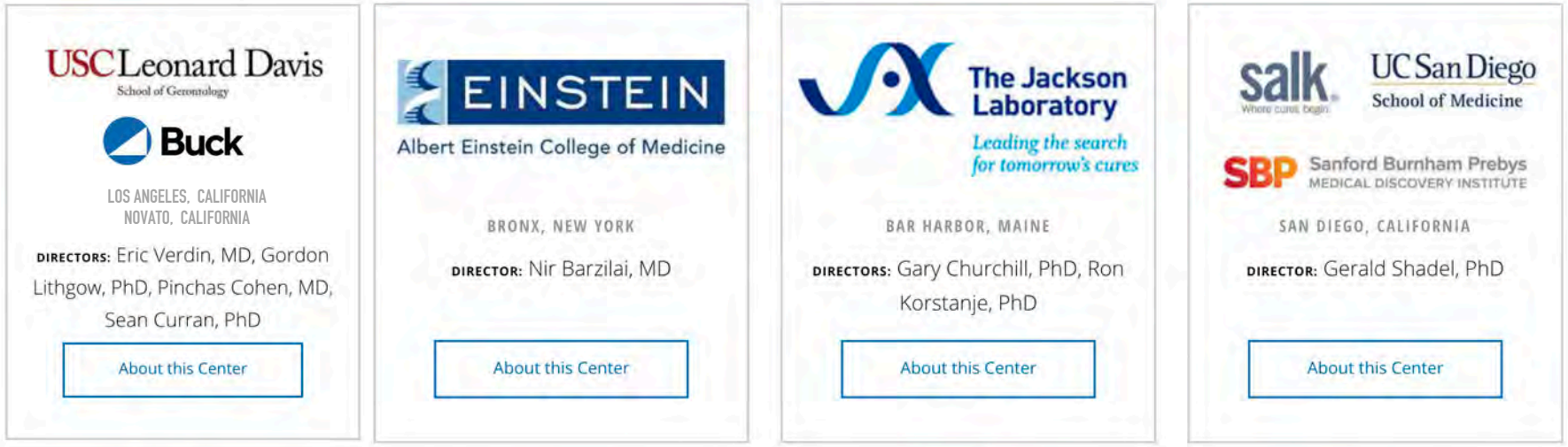
Research Development Core – Julie Andersen/Kelvin Davies

Cell Senescence and Beyond Core – Judy Campisi/Birgit Schilling

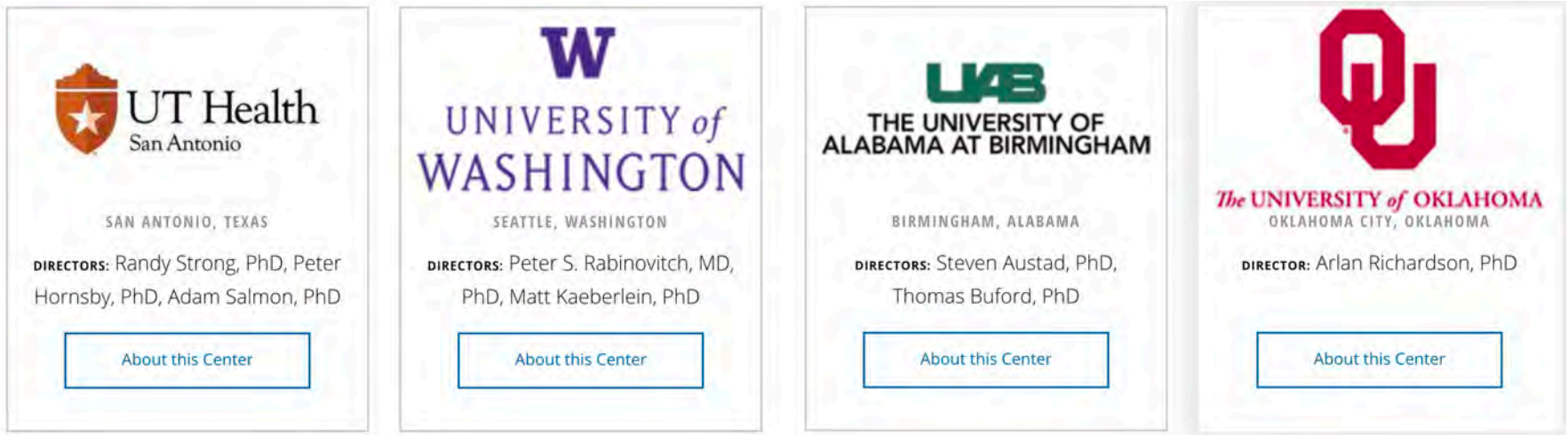
Genomic Translation Across Species Core – Em Arpawong/Eileen Crimmins

Q&A

https://uscbucknsc.org/



Nathan Shock Centers of Excellence



Nathan Shock Centers of Excellence in the Basic Biology of Aging

Nathan W. Shock (1906–1989) was known as the "father of gerontology" and head of the Gerontology Research Center of the NIH for nearly 35 years - until 1976. He then became scientist emeritus at the center.

He was one of the first scientists to foresee the importance of using longitudinal methods to study human aging. He clocked the rate at which different organs of the body age and showed that different individuals age at different rates.

He was the author of more than 300 journal articles and books and detailed his research in Scientific American 206:100-10, 1962.

Nathan Shock Centers of Excellence in the Basic Biology of Aging

What do the Nathan Shock Centers do?

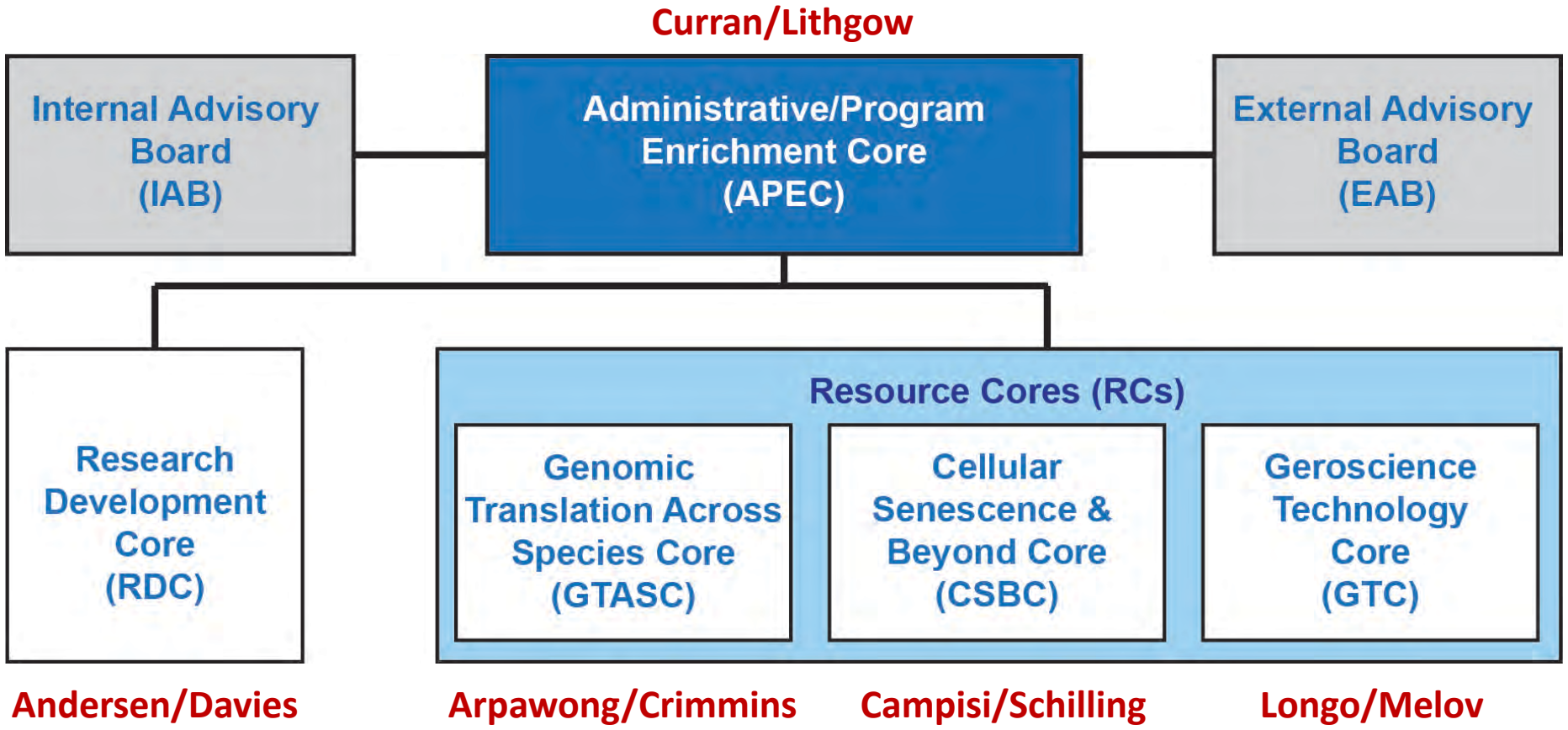
- The Centers provide leadership in the pursuit of basic research into the biology of aging. They do so through a Research Development Core which administers small start-up funds locally and organizes national annual meetings to highlight specific areas of research.

- In addition, each Nathan Shock Center has several specialized cores that provide services to Shock Center members, as well as for-fee services to the community at large. The cores are different in each Center, depending on the strengths of each Institution.

USC-Buck NSC is greater than the sum of its parts

Co-leaders:
Sean Curran and Gordon Lithgow

Organization



Invigorating the geroscience research community

Engage geroscience experts

Spark innovative geroscience research

Facilitate and foster new geroscience collaborations

Provide access to geroscience technology

Train the next generation of geroscience researchers

Provide geroscience project support

Administrative support

Programmatic

- Tara Riley
- Linda Hall/Gillian Miller

Communication

- Orli Belman
- Robin Snyder

Financial

- Kira Harvath
- Sarah Lines

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Geroscience Technology Core

Co-leaders

Valter Longo and Simon Melov

Geroscience Technology Core (GTC)

- Provide advice on the design of geroscience studies across model organisms
- Facilitate access to several technology development pipelines

- Coordinate the geroscience technologies at USC and the Buck to accelerate research studies
- Promote use of resources at both USC and the Buck to enhance study design

List of Technology Platforms

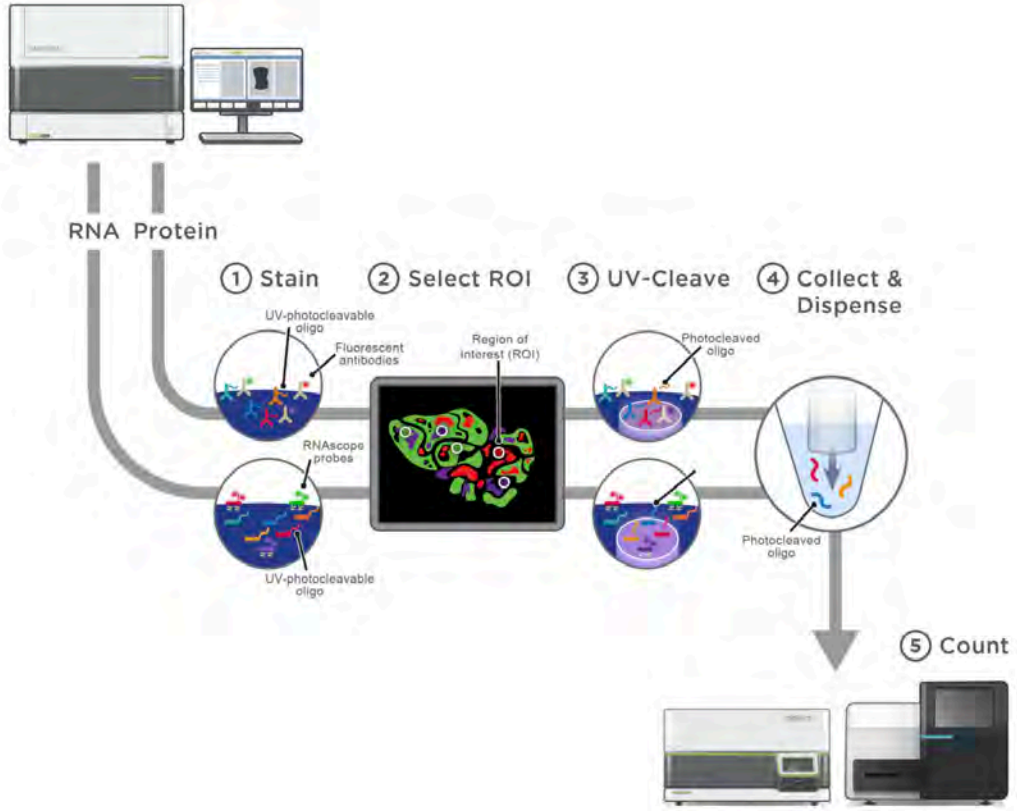
- MITOCHONDRIA AND METABOLISM TECHNOLOGY PLATFORM (**MMTP**)
- MODEL ORGANISMS HEALTHSPAN AND RESILIENCE TECHNOLOGY PLATFORM (**MOHRTP**)
- NEXT-GENERATION TECHNOLOGY PLATFORMS (**NGTPS**)
  - Highlight a recent funded example

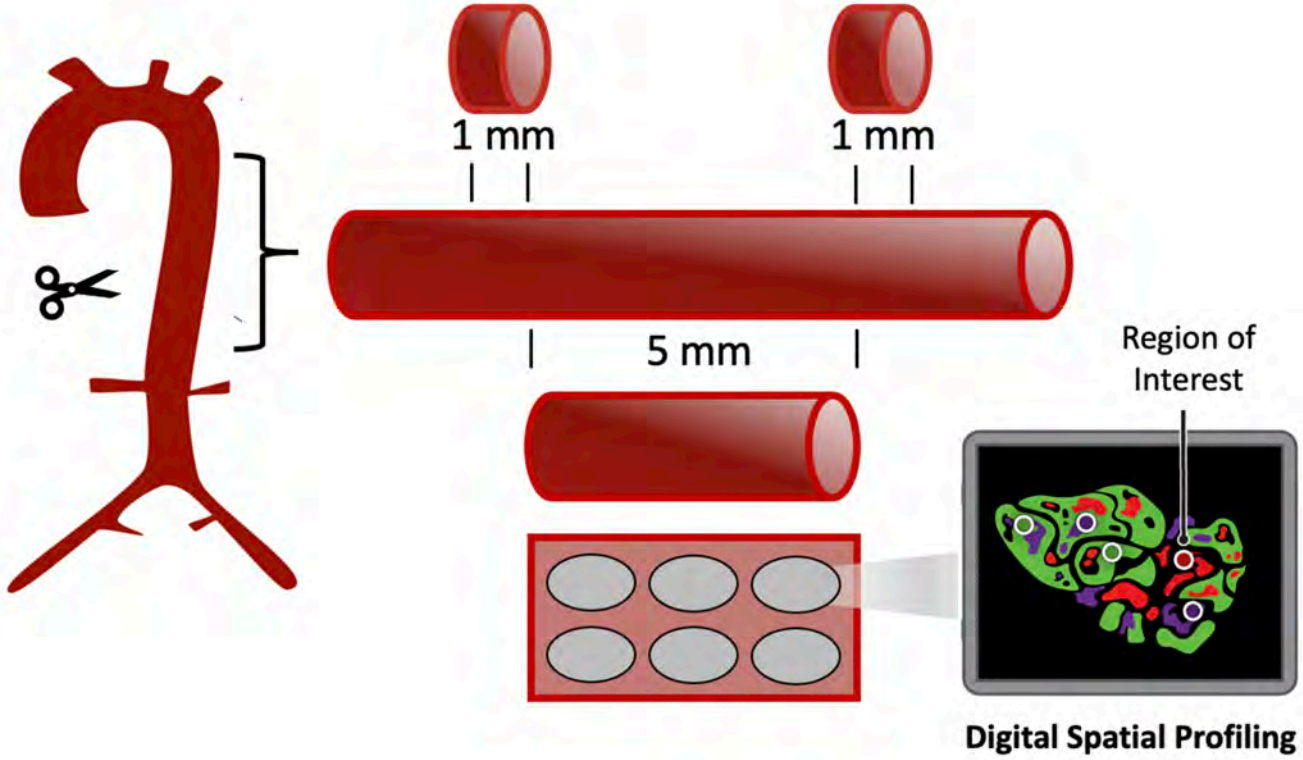
Pilot program to generate data for grants/papers

- Aging vasculature an important problem (no treatments)
- Spatial profile of aging blood vessels poorly characterized
- Doug Seals/Zach Clayton (UC Boulder) proposed a pilot to better understand vascular dysfunction
- Uses state of the art transcriptional profiling of aging aortas

Spatial transcriptomic/proteomic profiling

GEOMX Spatial profiler (Nanostring)





Doug Seals, Zach Clayton (UC Boulder, CO)

Analyzed data expected June 2021

Core Pilots and Vouchers

Mouse Phenotyping Core

Biomarker Core

Mitochondria Core

Bioinformatics Core (NSC-GTASC)

Genomics Core

Multiscale imaging center

AI and data science

Flow cytometry

Metabolomics

Morphology and Imaging

Proteomics (NSC-CSBC)

Single Cell biology

Funding for faculty partnerships

https://gero.usc.edu/faculty/ **https://www.buckinstitute.org/research/faculty/**

Single cell RNA seq - 10X genomics

Miniseq – small genome sequencer (invertebrates, mitochondria, etc.)

Model systems: yeast, worm, fly, killifish, mouse, etc.

Focused projects on: mitochondrial peptides, diet, air pollution, multiscale imaging, sexual dimorphism, etc.

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NATHAN SHOCK CENTER

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