Avoiding obsolescence without instrumentation grants

Strategies for Funding Large Instrument Upgrades in a Relatively Small Research Core Facility

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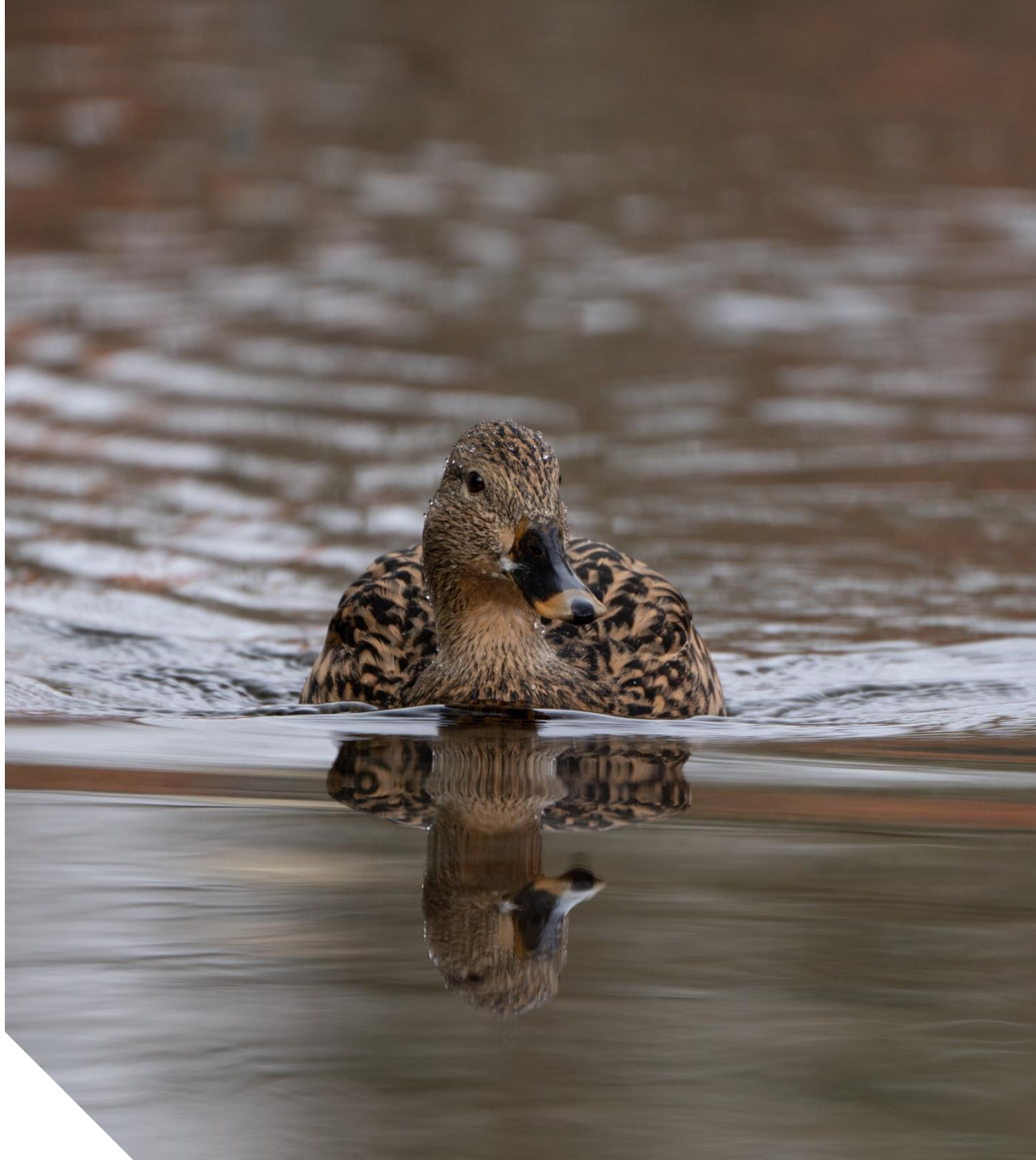
UNIVERSITY OF OREGON



GC3F: Genomics and Cell Characterization Core Facility History

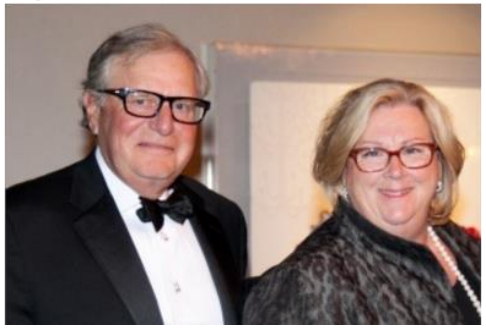
- Established in 2008 with HHMI-funded Illumina Genome Analyzer
- Added Flow Cytometry in 2014 (Murdock grant)
- Instrument refresh / expansion in 2016 funded by $2M Boyle family gift and Murdock Grant (PacBio, 10X, HiSeq 4k)

M.J. Murdock CHARITABLE TRUST

Chris Doe

hhmi | Howard Hughes Medical Institute

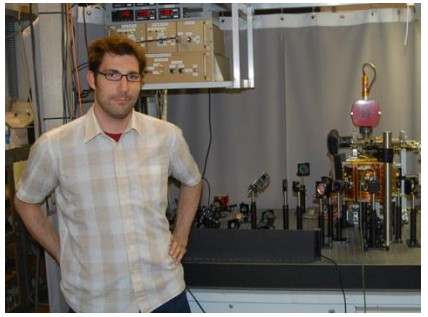
Columbia

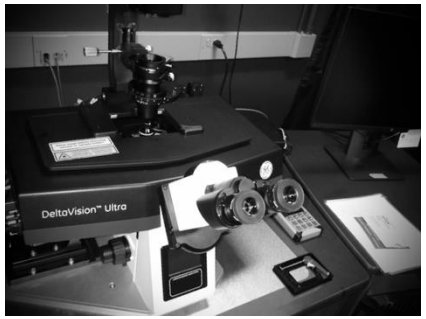


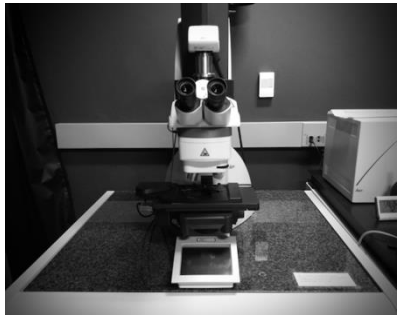
GC3F: Genomics and Cell Characterization Core Facility History

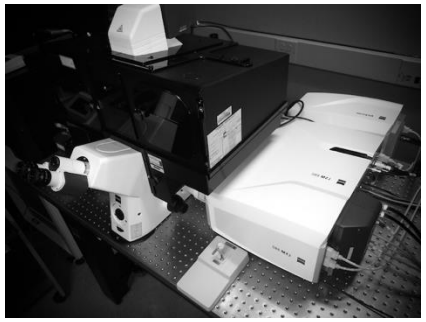
- Even more services added in 2019: Microscopy and Mass Spec
- Illumina Sequencer updated to NovaSeq 6k in 2020 (Murdock grant)
- Became a CLIA lab during the pandemic, $2M from Oregon Health Authority added lots of capacity

Adam Fries



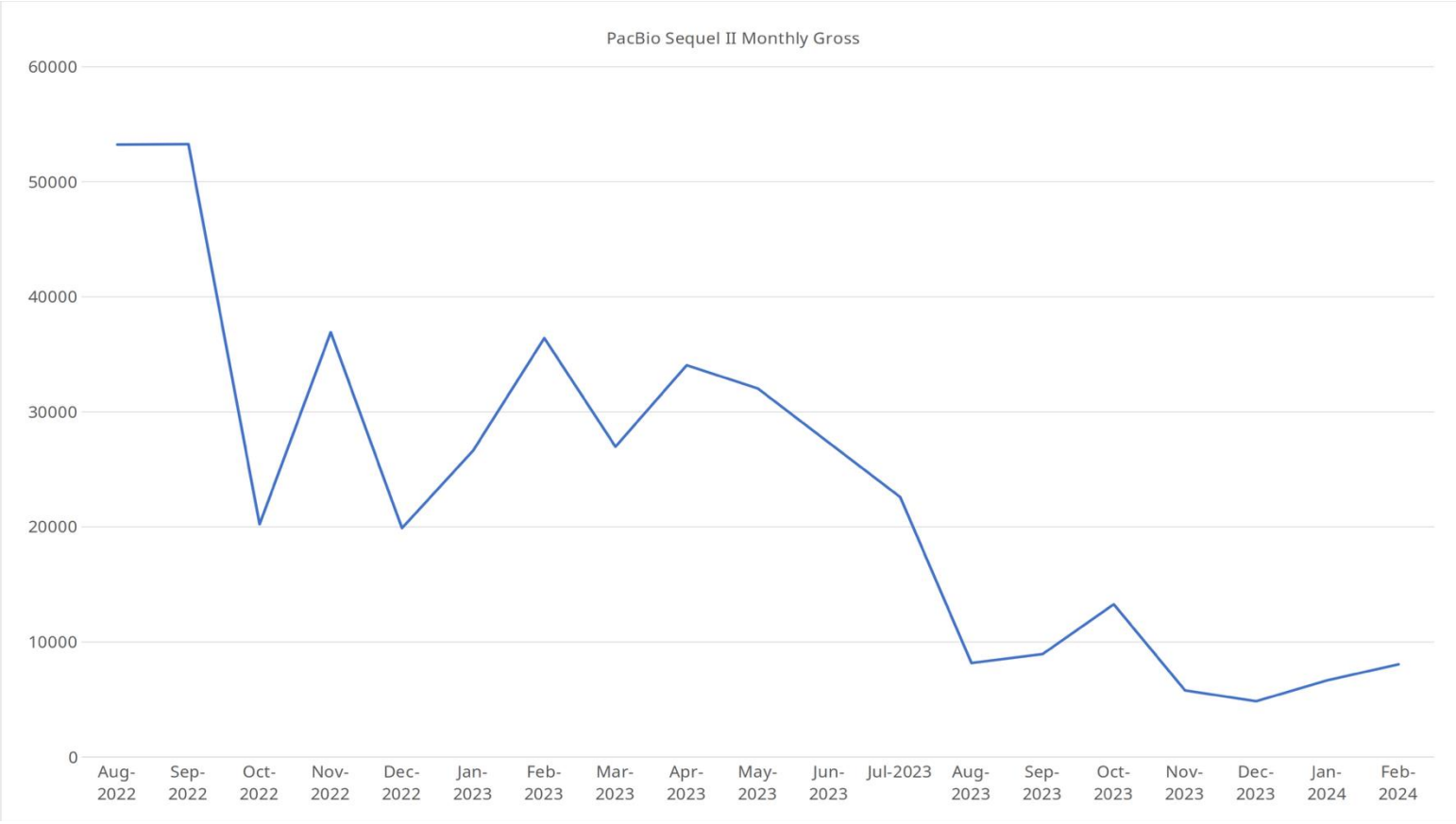


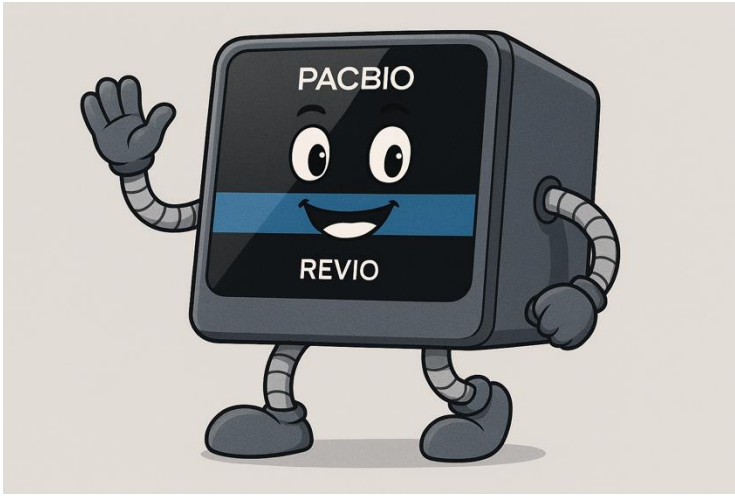


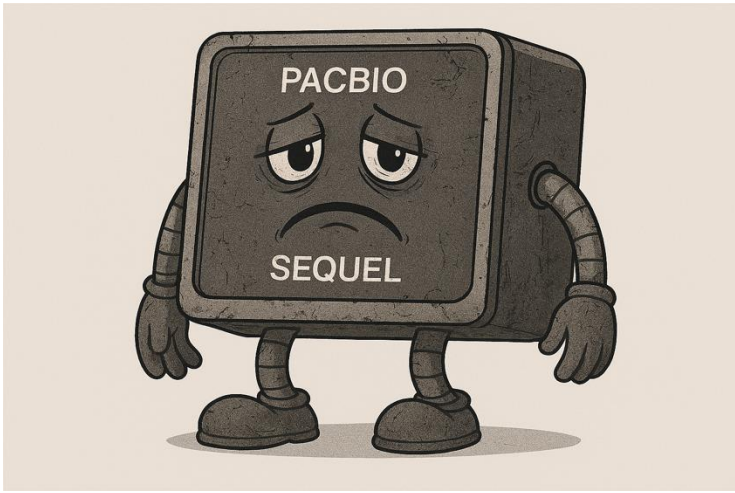


The joys of running an NGS core...

- PacBio Sequel II Service was "killing it" until mid/late 2023







PacBio Sequencer Refresh effort

- Spoke with leadership about potential Murdock. No dice
- Internal competition for NSF MRI submission. Grrrrrrr....
- Use institutional funds to purchase?
    - Can it "pay for itself"?

Making the case for Revio Purchase (full price)

	A	B	C	D	E	F	G
1	**Run Cost**	**Internal Rate**	**External rate**				
2	$995	$1,383	$2,061				
3							
4	**Max cells per week**		**total percent utilization**				
5	20		40%				
6							
7	**Actual cells per week**		**Weekly internal utilization**			**Weekly External utilization**	
8	8		30%			70%	
9							
10	**Internal cells per week**						
11	2.40						
12	**External cells per week**						
13	5.60						
14							
15							
16	**Gross total weekly revenue**						
17	$14,859						
18							
19	**Gross total monthly revenue**						
20	$59,436						
21							
22	**Gross total yearly revenue**						
23	$713,230						
24							
25	**Net Total weekly revenue**			**System cost**		**Weeks to break even**	
26	$6,899			$779,000		113	
27							
28	**Net Total monthly revenue**					**Months to break even**	
29	$27,596					28	
30							
31	**Net Total yearly revenue**					**Years to break even**	
32	$331,150					2.4	

PacBio rep called with an offer…

- A Revio system used in the All of Us project had been returned and refurbished

	A	B	C	D	E	F	G
1	**Run Cost**	**Internal Rate**	**External rate**				
2	$995	$1,383	$2,061				
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4	**Max cells per week**		**total percent utilization**				
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22	**Gross total yearly revenue**						
23	$713,230						
24							
25	**Net Total weekly revenue**			**System cost**		**Weeks to break even**	
26	$6,899			$375,000		54	
27							
28	**Net Total monthly revenue**					**Months to break even**	
29	$27,596					14	
30							
31	**Net Total yearly revenue**					**Years to break even**	
32	$331,150					1.1	

Now what do we do about the aging NovaSeq?

- No instrument grants look promising
- Service contract is painfully expensive
- Spoke with First American about lease options
  - Do we really want to own a large sequencer that is over 3 years old?
- Compared cost of NovaSeq X lease to NovaSeq 6k service contract

NovaSeq X lease calculations

	A	B	C	D	E	F	G
1			Annual			Annual	
2	NovaSeq 6000 annual cost (service contract)		NovaSeq X Lease cost (36 Month)			Added cost for NovaSeq X	
3	$130,997		$230,470			$99,473	
4							
5	Additional Monthly Revenue Needed for X		Monthly NovaSeq X lease payment			Additional monthly cost for X	
6	$8,289		$19,206			$8,289	
7							
8	Average monthly gross Novaseq 6k revenue						
9	$79,797						
10							
11	Average monthly net Novaseq 6k revenue						
12	$39,899						
13							
14	Net Revenue needed to “break even” with X						
15	$48,188						
16							
17	% increase needed to justify lease cost						
18	20.78%						

How many lanes would we need to run with competitive rates?

NovaSeq X				
Run type	**Provider**	**Price**	**Margin**	
10B PE150	genohub california	$1,500.00	$360.00	
10B PE150	genohub new jersey	$2,210.00	$1,070.00	
10B PE150	SeqCenter	$1,580.00	$440.00	
10B PE150	PlasmidSaurus	$1,500.00	$360.00	
			Average margi	**Monthly lanes needed**
			$557.50	86

Where do we go from here?

- Lean in to expanded Library Prep services
  - Miniaturized WGS preps using Echo and Hamilton liquid handlers: external rate <$4 per library!
- If you can't beat 'em, join 'em?
  - Outsourcing NovaSeq X lanes to PlasmidSaurus
- Adopt the next generation of sequencing tech early
  - Have been priming leadership for this
  - Maybe Roche?
- Raise rates for services formerly "subsidized" by seq revenue


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