uOttawa

Cooking up New In-House Organic Sulfur Calibration Materials

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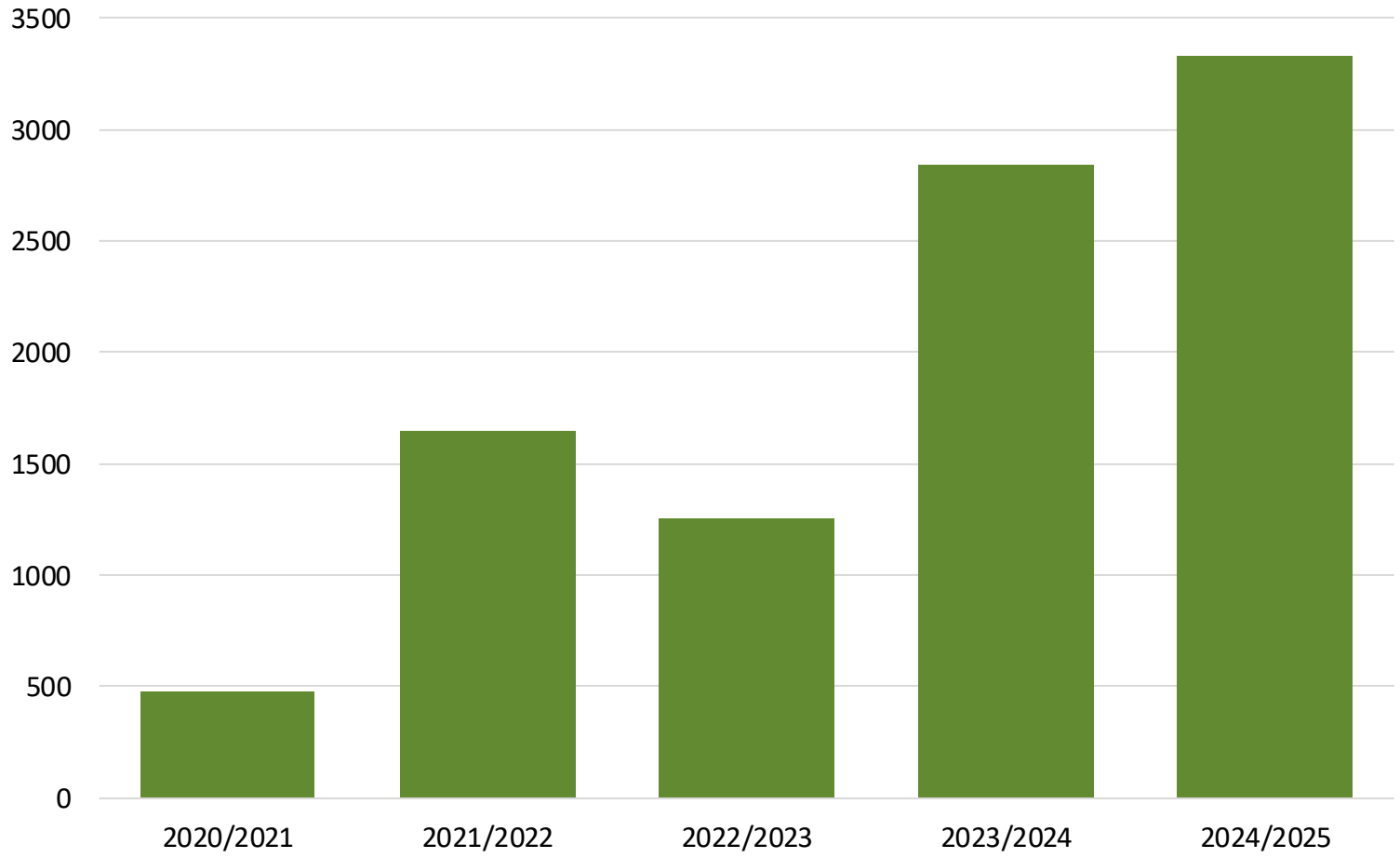
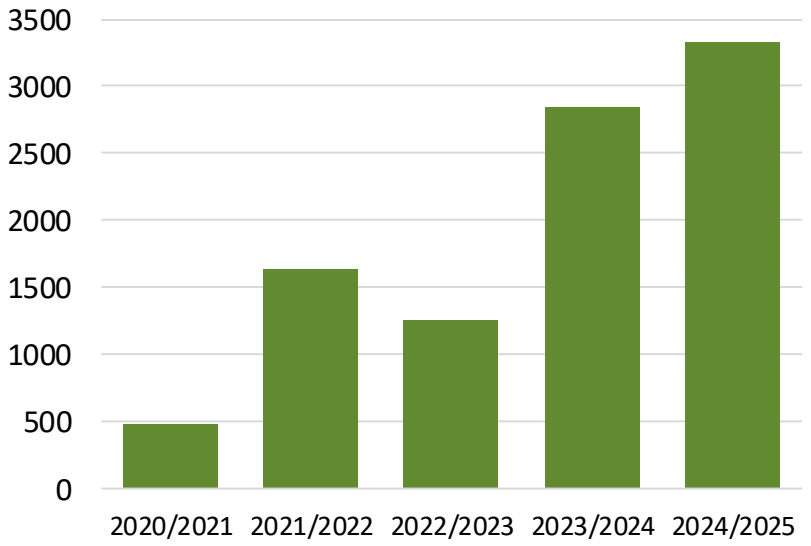
Number of Sulfur Samples Analyzed per Year by JVSIL



Number of Sulfur Samples Analyzed per Year

Reference material	%S	$\delta^{34}S$	SD	Material for 20ugS
IAEA-S-1	12.94	-0.30	0.03	0.15mg
IAEA-S-2	12.94	+22.62	0.08	0.15mg
IAEA-S-3	12.94	+32.49	0.08	0.15mg



Currently Available Organic Sulfur Reference Materials

Reference material	%S	$\delta^{34}S$	SD	Cost
USGS42 Tibetan Human Hair	4.4	+7.84	0.25	429$ USD for 0.5g
USGS43 Indian Human Hair	4.5	+10.46	0.22	429$ USD for 0.5g
USGS88 marine collagen from wild-caught fish	0.46	+17.10	0.44	275$ USD for 0.5g
USGS89 porcine collagen	0.28	+3.86	0.56	275$ USD for 0.5g
USGS90 millet flour from Tuscany, Italy	0.13	-15.14	0.67	275$ USD for 0.5g
USGS91 tropical Vietnamese rice flour	0.13	-20.85	0.72	275$ USD for 0.5g
B2157 Wheat flour	0.092	-2.38	0.80	171$ CAD for 5g
B2159 Sorghum flour	0.095	+10.11	1.00	171$ CAD for 5g
B2215 Gelatin	0.41	+0.69	0.3	197$ CAD for 2g
B2219 Coldwater fish gelatin	0.43	+17.05	0.07	177$ CAD for 2g
B2222 Bovine gelatin powder	0.43	+6.79	0.08	177$ CAD for 2g
B2224 Kelp powder	2.31	+21.73	0.40	191$ CAD for 1g

Currently Available Organic Sulfur Reference Materials

Reference material	%S	$\delta^{34}S$	SD	Cost	Material for 20ugS
USGS42 Tibetan Human Hair	4.4	+7.84	0.25	429$ USD for 0.5g	**0.4mg**
USGS43 Indian Human Hair	4.5	+10.46	0.22	429$ USD for 0.5g	**0.4mg**
USGS88 marine collagen from wild-caught fish	0.46	+17.10	0.44	275$ USD for 0.5g	**4.4mg**
USGS89 porcine collagen	0.28	+3.86	0.56	275$ USD for 0.5g	**7.1mg**
USGS90 millet flour from Tuscany, Italy	0.13	-15.14	0.67	275$ USD for 0.5g	**15.4mg**
USGS91 tropical Vietnamese rice flour	0.13	-20.85	0.72	275$ USD for 0.5g	**15.4mg**
B2157 Wheat flour	0.092	-2.38	0.80	171$ CAD for 5g	**21.7mg**
B2159 Sorghum flour	0.095	+10.11	1.00	171$ CAD for 5g	**21.1mg**
B2215 Gelatin	0.41	+0.69	0.3	197$ CAD for 2g	**4.9mg**
B2219 Coldwater fish gelatin	0.43	+17.05	0.07	177$ CAD for 2g	**4.7mg**
B2222 Bovine gelatin powder	0.43	+6.79	0.08	177$ CAD for 2g	**4.7mg**
B2224 Kelp powder	2.31	+21.73	0.40	191$ CAD for 1g	**0.9mg**

In-House Materials from Sigma

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What makes a good standard material?

- Powdered
- Homogenous – both isotopically and grain size
- Similar matrix to samples
- Easy to obtain in bulk
- Cheap!

- Decent sulfur content

What makes a good standard material?

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Sulfur Isotopes of Garlic Powder

Sulfur Isotopes of Garlic Powder

+4.8 ‰

+2.7 ‰

+4.3 ‰

+4.9 ‰

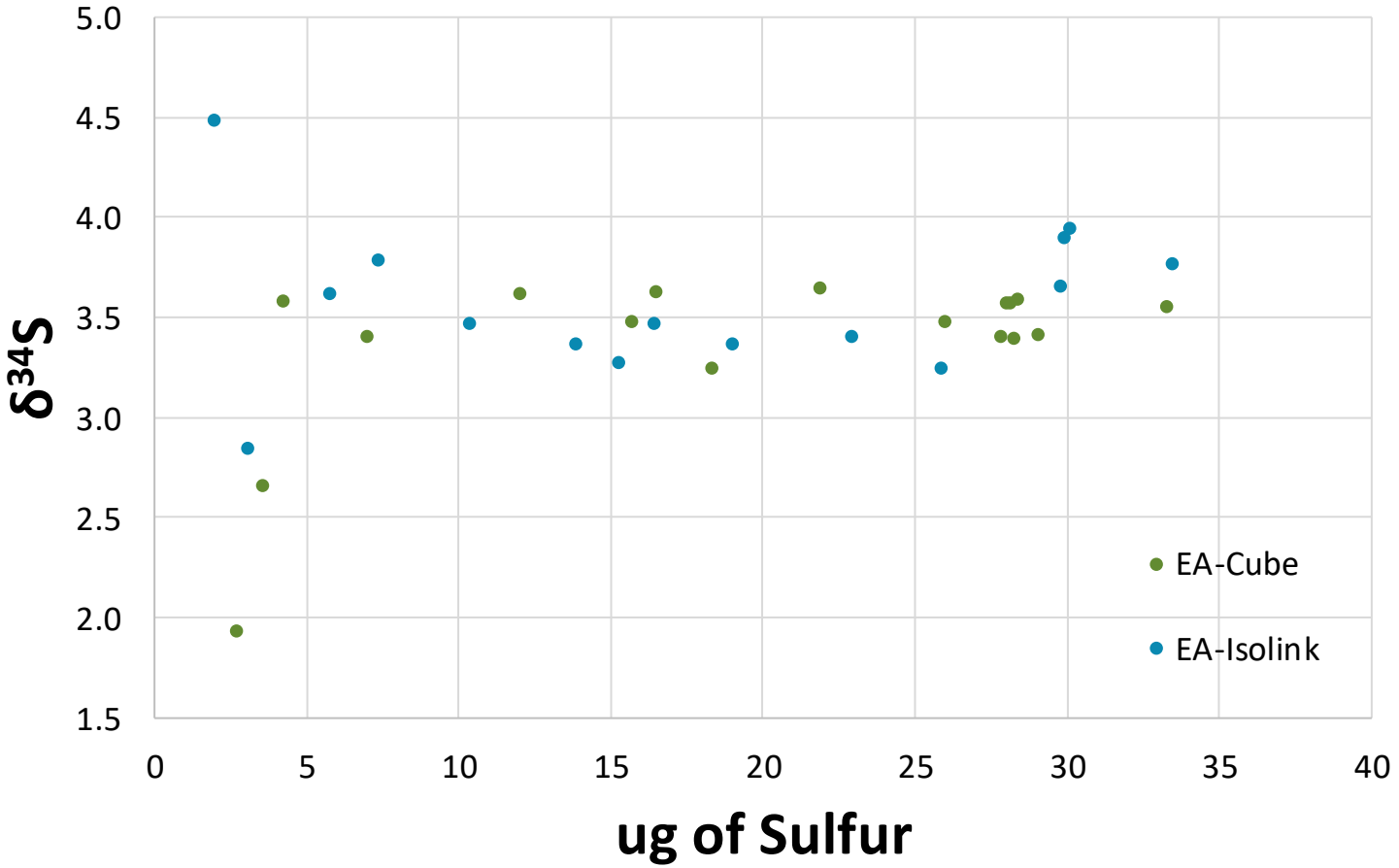
-3.7 ‰

+3.9 ‰

Sulfur values ranged from **-3.7 ‰** to **+4.9 ‰**

Sulfur Isotopes of Garlic Powder

Is Garlic Powder Isotopically Homogenous?



Characterizing In-House Materials

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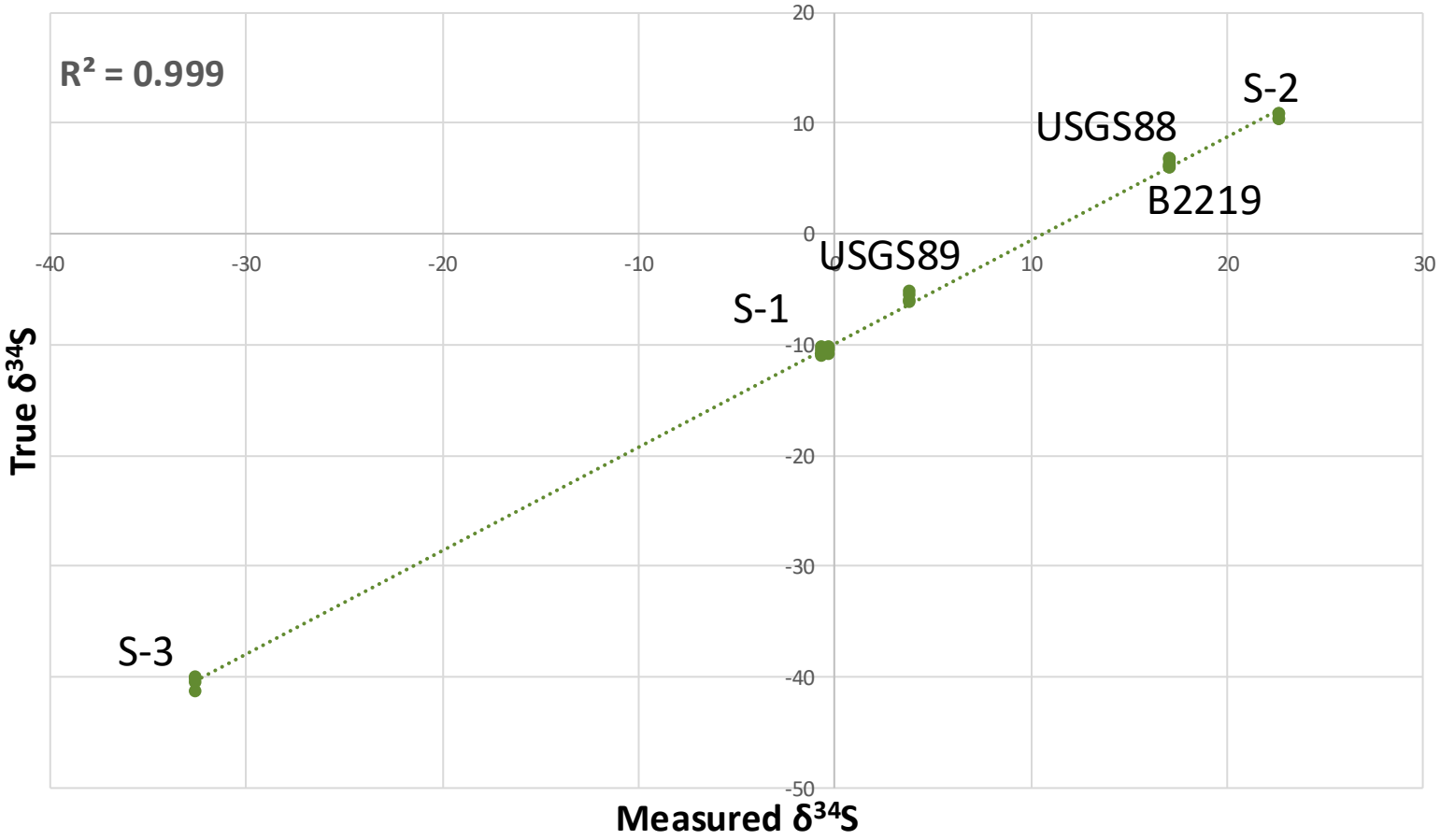


Characterizing In-House Materials

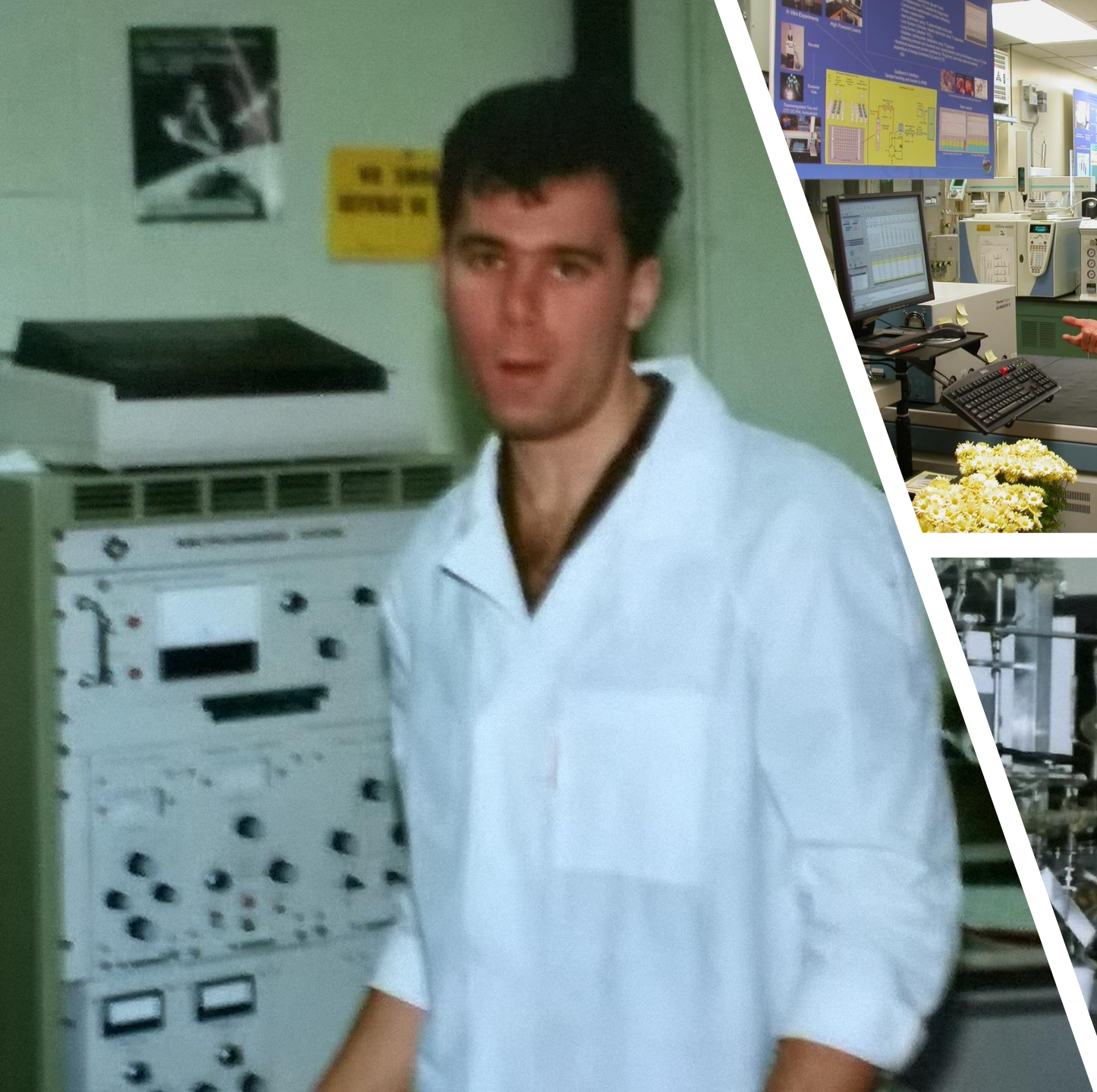
Standard Name	approx. %S	n	avg	SD
Agar	0.33	12	**18.5**	0.45
Gelatine from cold water fish skin	0.50	22	**16.9**	0.39
Gelatine from bovine skin	0.24	12	**6.0**	0.26
Altius Garlic Powder	0.82	12	**3.7**	0.30
Kirkland Garlic Powder	1.01	12	**-3.0**	0.60

Thank you!

And since I have some extra time….

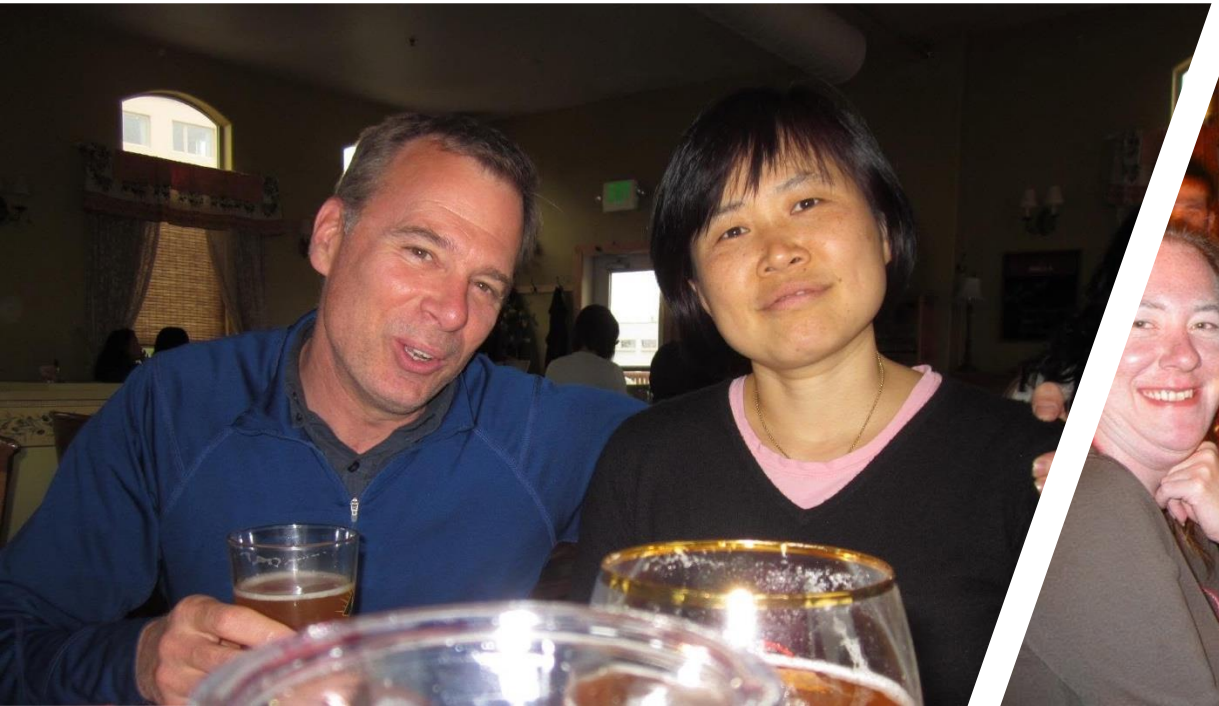
Paul Middlestead

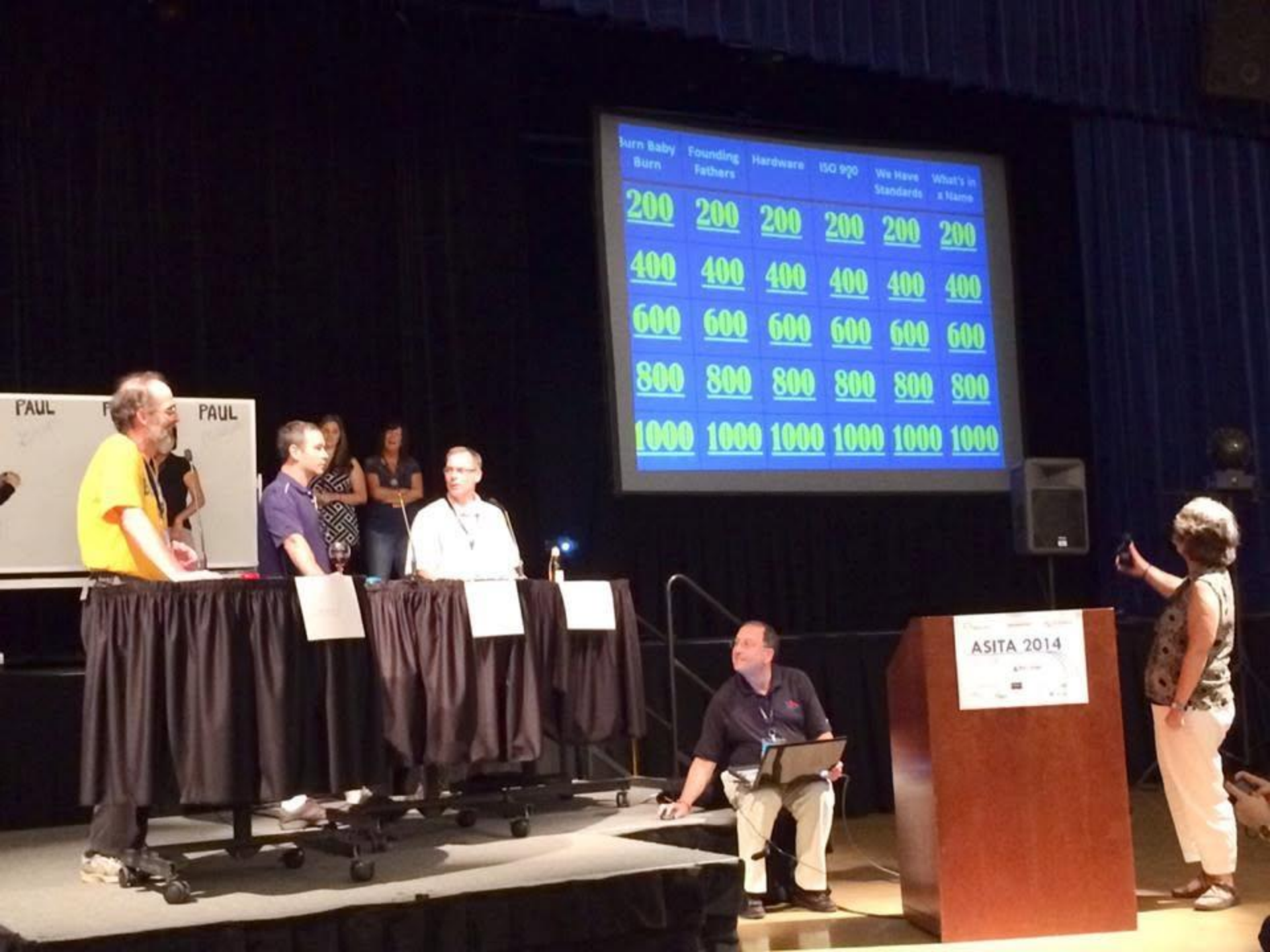
1989!




DELL


FONTS




Burn Baby Burn
Founding Fathers
Hardware
ISO 900
We Have Standards
What's in a Name
200 200 200 200 200 200
400 400 400 400 400 400
600 600 600 600 600 600
800 800 800 800 800 800
1000 1000 1000 1000 1000 1000
PAUL
PAUL
ASITA 2014


HOFBRÄU MÜNCHEN
40


SOSPARK


ASITA 2024
June
16th – 19th
Advances in Stable Isotope
Techniques and Applications
Keynote Speakers:
ensense
sercon
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Happy Retirement