



We will begin momentarily at 2pm ET



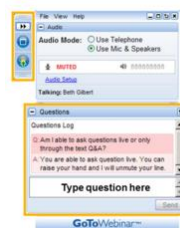
Recordings will be available to ACS members after three weeks

<http://acswebinars.org>

Contact ACS Webinars ® at acswebinars@acs.org

1

Have Questions?



“Why am I muted?”

Don't worry. Everyone is muted except the presenter and host. Thank you and enjoy the show.

Type them into questions box!

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Fan of the Week


Darrel W. Johnston, PMP
Sr. Program Manager,
Demilitarization Laboratory Support
Southwest Research Institute





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“ACS Webinets™ are 2 minute segments that bring you valuable insight from some of our most popular full length ACS Webinars®”



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Beginning in 2014 all recordings of ACS Webinars will be available to current ACS members two weeks after the Live broadcast date.

Live weekly ACS Webinars will continue to be available to the general public.

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Upcoming ACS Webinars®

www.acs.org/acswebinars



Thursday, September 4, 2014

“Planting the Seeds of Sustainable Chemistry”

Dr. Jennie Dodson, Chair of the Network of Early-Career Sustainable Scientists and Engineers (NESSE)

Dr. Cliff Coss, Vice Chair/Treasurer of NESSE and co-founder and Chief Technology Officer of GlycoSurf



Thursday, September 11, 2014

“Garlic and Other Alliums: The Lore and the Science”

Dr. Eric Block, Professor of Chemistry, University of Albany, and ACS Fellow

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Forecasting Chemistry: Predicting Tomorrow's Cutting Edge Science, Today



Ted Sanders
NSF Graduate Fellow
Stanford University



Dr. Charles Twardy
SciCast
George Mason University



Dr. Darren Griffin
University of Kent

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FORECASTING CHEMISTRY



Predicting Tomorrow's Cutting Edge Science, Today

Charles Twardy, SciCast PI
ACS Webinar
August 21, 2014



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GOALS FOR TODAY



Introduce SciCast and forecasting

Introduce the team and project

Provide a tutorial and discussion

- Market overview
- How to make forecasts
- How to generate questions

Show examples

Get you involved

POLL: NOBEL PRIZE



In which branch will the 2014 Nobel Prize in Chemistry be awarded?

- Analytical chemistry
- Inorganic chemistry
- Organic chemistry
- Biochemistry
- Physical chemistry
- Other (type in your "other" response)

SCICAST FORECASTED RESULTS



In which branch will the 2014 Nobel Prize in Chemistry be awarded?

- | | |
|------------------------|-----|
| • Analytical chemistry | 6% |
| • Inorganic chemistry | 6% |
| • Organic chemistry | 34% |
| • Biochemistry | 45% |
| • Physical chemistry | 5% |
| • Other | 4% |

SCICAST FORECASTED RESULTS



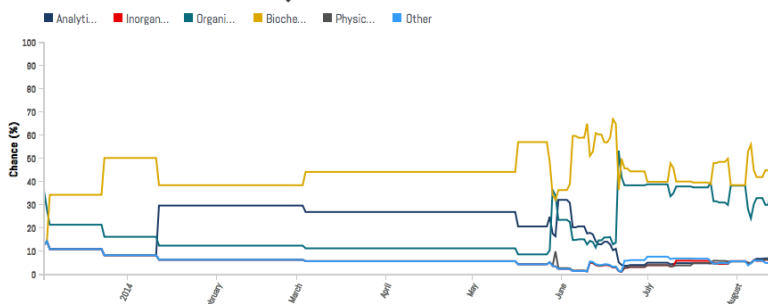
In which branch will the 2014 Nobel Prize in Chemistry be awarded?



Make a Forecast Discussion (3) Background Trends & History

Trends

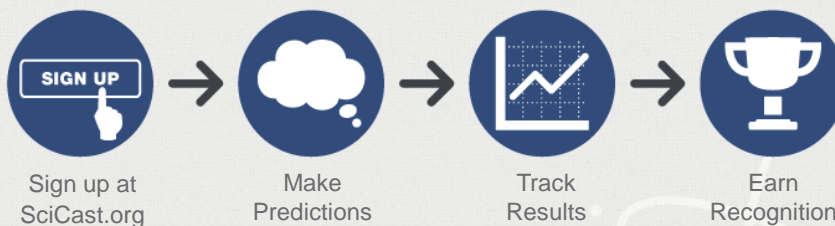
Trend data is updated multiple times per day. The last **Biochemistry** graph is always the current forecast for that answer.



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HOW SCICAST WORKS



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HOW SCICAST WORKS



Sign up at
SciCast.org



Make
Predictions



Track
Results

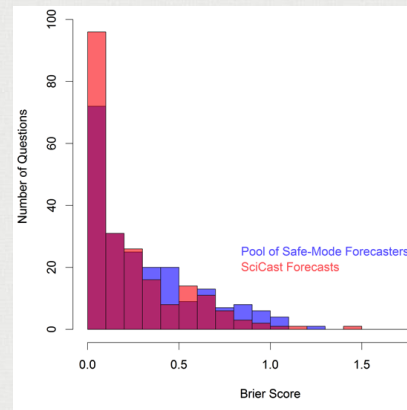
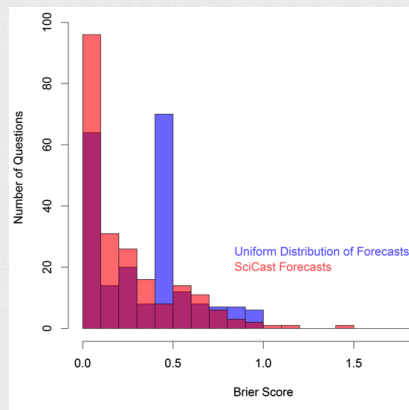


Earn
Recognition

- You receive **points**.
- Each forecast **requires** points.
- Bigger changes cost more – but **gain more** if you're right.
- Better forecasters **have more influence**.

DOES IT WORK?

We beat the baseline more than
2/3 of the time.



THE PROJECT



Research project funded by IARPA

- Dr. Jason Matheny is the IARPA Program Manager
- Began as the DAGGRE team in the IARPA ACE geopolitical forecasting tournament
- One of two teams to pass Y2 hurdles
 - Moved to S&T forecasting under the new ForeST program and renamed SciCast
- Actively collecting data and testing forecasting related hypotheses

Collaborating with the IARPA FUSE program

- FUSE mines text from scientific journals around the world
- FUSE teams write many SciCast questions

OUR TEAM



George Mason University

Serving as the prime contractor and providing the scientific leadership of the effort.



Inkling Markets

Designing and implementing the user interface and operating the market.



GoldBrand Software

Developing the core and integrating other software.



Tuuyi

Developing the Recommender and a new Bayesian inference engine for the market.



KaDSci

Providing market operation and outreach support as well as intelligence analysis expertise.

TEAM LEADERSHIP



CHARLES TWARDY, PH.D.
PRINCIPAL INVESTIGATOR

Dr. Twardy is a research assistant professor at George Mason University with a dual Ph.D. in Cognitive Science and History & Philosophy of Science. He works on Bayesian inference.

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KATHRYN LASKEY, PH.D.
CO-PRINCIPAL INVESTIGATOR

Dr. Laskey is a professor of systems engineering and operations research at George Mason University. She focuses on knowledge representations for Bayesian inference and learning.

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ROBIN HANSON, PH.D.
ACADEMIC ADVISOR

Dr. Hanson is an associate professor of economics at George Mason University. He has over 70 publications and has pioneered prediction markets since 1988.

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POLL: EBOLA



Will the 2014 West Africa Ebola outbreak lead to confirmed cases in 5 or more African countries by the end of the calendar year?



SCICAST FORECASTED RESULTS



Will the 2014 West Africa Ebola outbreak lead to confirmed cases in 5 or more African countries by the end of the calendar year?



Make a Forecast

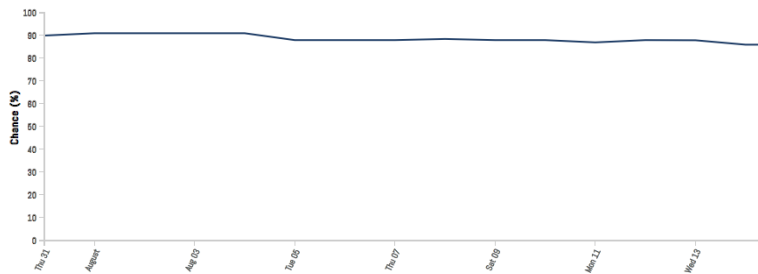
Discussion (8)

Background

Trends & History

Trends

Trend data is updated multiple times per day. The last value on the graph is always the current forecast for that answer.



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SCICAST FORECASTED RESULTS



Will the 2014 West Africa Ebola outbreak lead to confirmed cases in 5 or more African countries by the end of the calendar year?



Make a Forecast

Discussion (8)

Background

Trends & History

Background Information

Ebola virus is sweeping across West Africa in the largest outbreak of the virus to date. It was first reported in Guinea in March 2014. The virus has spread to neighboring Liberia and Sierra Leone in the last few months. The question is whether the deadly virus will keep crossing borders to infect more people in other countries.

- <http://www.bbc.com/news/world-africa-28522824>
- <http://news.yahoo.com/uncontrollable-ebola-outbreak-spreads-fourth-african-country-145519817.html>

ACCEPTING FORECASTS UNTIL:

12/31/2014

RESOLUTION SOURCE

The World Health Organization updates Ebola outbreak information on its website: <http://www.who.int/csr/disease/ebola/en/>

FINE PRINT

The World Health Organization lists confirmed, probably and suspect cases of the Ebola virus. For countries to be included in the final count, they must have at least 1 confirmed human case of Ebola in the 2014 calendar year.

KEYWORDS

Ebola, virus, Africa

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WHAT IS SCICAST?



SciCast is a prediction market focused on science and technology.

We aggregate the knowledge and expertise of a diverse group of professionals and non-professionals from around the world and return probable forecasts on future innovations.

SciCast is different from other prediction markets because it can create and explore relationships between questions.

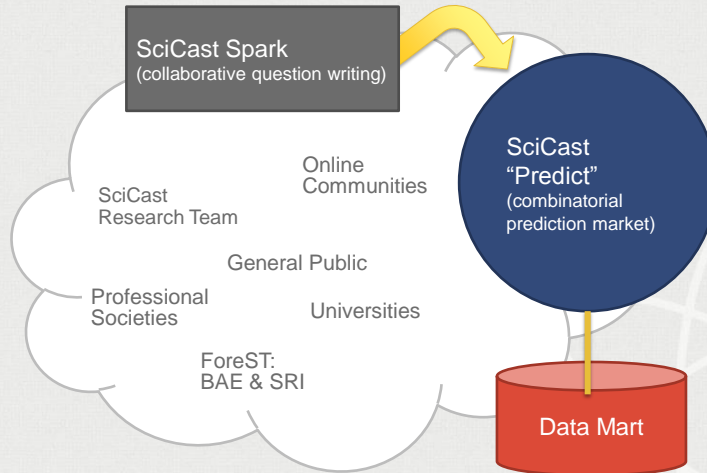
PARTICIPATION



79,316 Forecasts Made

- 9,000+ registered participants
- 800+ questions published
- 500+ questions currently live
- 300+ forecasts per day

SCICAST ECOSYSTEM



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OUR CROWD



Collaborators



BAE SYSTEMS

Partners



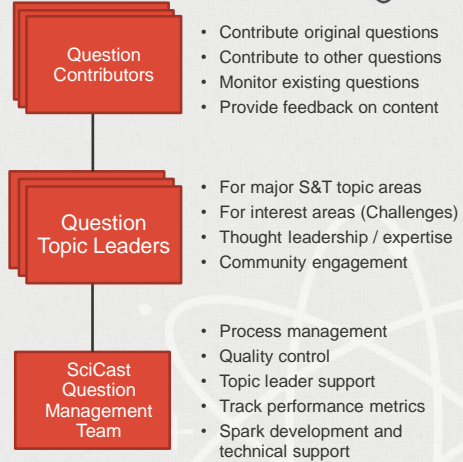
AAAS



ISACA

AMIA

TEHCAST GLOBAL



LANDING PAGE



MY DASHBOARD
QUESTIONS
SEARCH battery

YOUR RECOMMENDED QUESTIONS

When will a transactinide isotope with a half-life longer than 29 hours be discovered?

LEADING POSSIBLE ANSWER

Will not be discovered by January 1, 2022

CURRENT FORECAST

37%

Unchanged today

WHAT DO YOU THINK?

LEADERBOARDS

Point Leaders

1	dvasya	25,048
2	PrieurDeL...	20,157
3	sflicht	19,802
4	jkominek	19,138
5	benthinkin	18,127
6	ted	16,214
7	Recycler	14,154
8	bw	13,040
9	Chambers	10,736
10	Tender	10,728
11	HAL9000	10,282

FORECAST TOPICS

Agriculture	Biology & Medicine
Business of Science	Chemistry
Computational Sciences	Energy

ACTIVITY

Grouped By Participant

- sflicht made a forecast on Will there be 15 or more named storms (including subtropical storms) in the Atlantic-Caribbean-Gulf of Mexico region during the 2014 hurricane season?
- jkominek made a forecast on On what date will Dolly be upgraded to a

POLL: TRANSACTINIDES



When will a transactinide isotope with a half-life longer than 29 hours be discovered?

HIDE POSSIBLE ANSWERS < Status: Open • Closed after: January 1 2021 • 87 Forecasts • 0 Comments

By December 31, 2015

Between January 1, 2016 and December 31, 2017


Between January 1, 2018 and December 31, 2019

Between January 1, 2020 and December 31, 2021

Will not be discovered by January 1, 2022

SCICAST FORECASTED RESULTS



 When will a transactinide isotope with a half-life longer than 29 hours be discovered?




HIDE POSSIBLE ANSWERS <

Status: Open • Closed after: January 1, 2021 • 87 Forecasts • 0 Comments

By December 31, 2015	8% Chance Unchanged today
Between January 1, 2016 and December 31, 2017	31% Chance Unchanged today
Between January 1, 2018 and December 31, 2019	12% Chance Unchanged today
Between January 1, 2020 and December 31, 2021	11% Chance Unchanged today
Will not be discovered by January 1, 2022	37% Chance

BACKGROUND INFO



 When will a transactinide isotope with a half-life longer than 29 hours be discovered?



[Make a Forecast](#) | [Discussion \(0\)](#) | [Background](#) | [Trends & History](#)

Background Information

Transactinide elements (chemical elements with atomic numbers above 103) are radioactive and thus far have only been obtained synthetically in laboratories. Transactinides and their isotopes are typically short lived, with half-lives of seconds or minutes, though an isotope of the element Dubnium (Db-268) has a half life of 29 hours - a record for a superheavy isotope. Much of the research on transactinide elements focuses on the discovery of the theorized 'island of stability' - a set of as-yet undiscovered isotopes of superheavy elements which are theorized to be more stable and have much longer half-lives than previously observed transuranium elements. The hypothesis is based upon the nuclear shell model, which implies that atomic nuclei are built up in "shells" in a manner similar to the structure of electron shells in atoms.

In May 2014, physicists created one of the heaviest elements yet, with an atomic number of 117, which has a half life of about 50 thousandths of a second. In the decay of element 117, two previously unknown isotopes were identified: Db-270 (dubnium) and Lr-266 (lawrencium). With half-lives of about one hour and about 11 hours, respectively, they are among the longest-lived superheavy isotopes known to date, perhaps science closer to the fabled the Island of stability.

- Scientific American - Superheavy Element 117 Points to Fabled "Island of Stability" on Periodic Table
- Wikipedia - Island of Stability
- Science Daily - Approaching the island of stability: Observation of superheavy element 117

ACCEPTING FORECASTS UNTIL:
01/01/2021

RESOLUTION SOURCE

The discovery of a transactinide isotope with a half life longer than that of Db-268 would represent a major breakthrough in physics and would likely be covered in a variety of academic journals, such as Nature Physics, as well as by the mainstream media and science publications.

BACKGROUND INFO

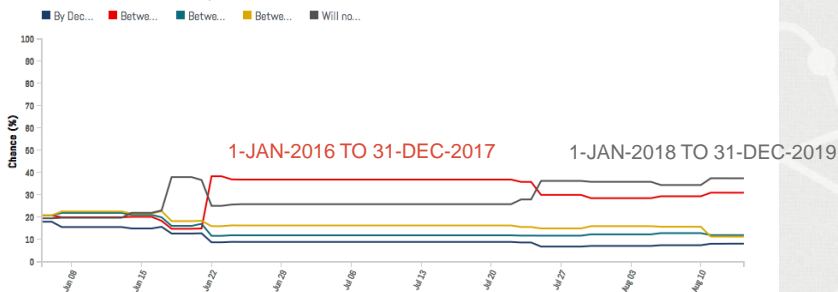


When will a transactinide isotope with a half-life longer than 29 hours be discovered?

Make a Forecast Discussion (0) Background Trends & History

Trends

Trend data is updated monthly. The graph is always the current forecast for that answer.



FORECAST HISTORY



When will a transactinide isotope with a half-life longer than 29 hours be discovered?

Forecast History

Date	Username	Possible Answer	Old Forecast	Forecast	New Forecast
August 12, 2014 07:39 PM	scicast33	By December 31, 2015	8% Chance	Very unlikely (10% - 20% Chance)	8%
August 10, 2014 01:35 AM	jkominek	Between January 1, 2020 and December 31, 2021	16% Chance	11% Chance	11%
August 05, 2014 07:39 PM	scicast33	Between January 1, 2018 and December 31, 2019	13% Chance	Unlikely (20% - 40% Chance)	13%
August 05, 2014 07:39 PM	scicast33	Between January 1, 2016 and December 31, 2017	29% Chance	Very unlikely (10% - 20% Chance)	29%
August 05, 2014 07:39 PM	scicast33	By December 31, 2015	7% Chance	Very unlikely (10% - 20% Chance)	7%
August 05, 2014 01:41 PM	pigmoose	Between January 1, 2016 and December 31, 2017	28% Chance	As likely as not (40% - 60% Chance)	29%
August 05, 2014 10:38 AM	william.quixote	Between January 1, 2020 and December 31, 2021	17% Chance	16% Chance	16%
August 05, 2014 10:37 AM	william.quixote	Between January 1, 2016 and December 31, 2017	29% Chance	28% Chance	28%
August 05, 2014 02:25 AM	Chambers	Between January 1, 2016 and December 31, 2017	29% Chance	29% Chance	29%

FORECASTING: SAFE MODE



🔬 When will a transactinide isotope with a half-life longer than 29 hours be discovered?



Make a Forecast

Discussion (0)

Background

Trends & History

By December 31, 2015 9%

Between January 1, 2016 and December 31, 2017 37%

YOUR FORECAST	CHANCES OF HAPPENING
<input type="radio"/> Almost surely	90% - 100%
<input type="radio"/> Very likely	80% - 90%
<input type="radio"/> Likely	60% - 80%
<input type="radio"/> As likely as not	40% - 60%
<input type="radio"/> Unlikely	20% - 40% <i>Current forecast</i>
<input type="radio"/> Very unlikely	10% - 20%
<input type="radio"/> Almost surely not	0% - 10%

SUBMIT YOUR FORECAST

SWITCH TO POWER MODE >

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FORECASTING: SAFE MODE



🔬 When will a transactinide isotope with a half-life longer than 29 hours be discovered?



Make a Forecast

Discussion (0)

Background

Trends & History



Thank you for making a forecast. Here is how you affected it:

POSSIBLE ANSWER	OLD CHANCE	YOUR FORECAST	NEW CHANCE
By December 31, 2015	9%		10% (up 1%)
Between January 1, 2016 and December 31, 2017	37%	Very unlikely	27% (down 10%)
Between January 1, 2018 and December 31, 2019	12%		14% (up 2%)
Between January 1, 2020 and December 31, 2021	16%		19% (up 2%)
Will not be discovered by January 1, 2022	28%		30% (up 4%)

MORE INTERESTING QUESTIONS...

If a transactinide isotope with a half-life longer than 29 hours is discovered by 2017, what will its atomic number be?

Will a lab-grown single-element quasicrystal be reported in a scientific journal before the end of 2020?

Will the US National Security

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FORECASTING: POWER MODE



When will a transactinide isotope with a half-life longer than 29 hours be discovered?



Make a Forecast Discussion (0) Background Trends & History

You've made 1 forecasts in this question and are performing better than 100% of other people who have made forecasts.

POSSIBLE ANSWERS AND CURRENT CHANCE

By December 31, 2015

10%

Between January 1, 2016 and December 31, 2017

27%

Between January 1, 2018 and December 31, 2019

14%

CURRENT FORECAST

14%

YOUR FORECAST

24%

Debit:18 Points

CHANGE FORECAST TO

24%



Always use power mode

SUBMIT YOUR FORECAST

SWITCH TO SAFE MODE >

MINIMUM AVAILABLE POINTS

4,256

YOUR PREVIOUS FORECASTS

Between January 1, 2016 and December 31, 2017
27%

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FORECASTING: POWER MODE



When will a transactinide isotope with a half-life longer than 29 hours be discovered?



Make a Forecast Discussion (0) Background Trends & History



Thank you for making a forecast. Here is how you affected it:

POSSIBLE ANSWER	OLD CHANCE	YOUR FORECAST	NEW CHANCE
By December 31, 2015	10%		9% (down 1%)
Between January 1, 2016 and December 31, 2017	27%		24% (down 3%)
Between January 1, 2018 and December 31, 2019	14%	24%	24% (up 10%)
Between January 1, 2020 and December 31, 2021	19%		17% (down 2%)
Will not be discovered by January 1, 2022	30%		28% (down 4%)

MORE INTERESTING QUESTIONS...

Will physicists find any difference in the magnetic moments of the antiproton and the proton when they achieve a direct high-precision measurement of the antiproton?

Scientists reported recently that sodium bismuthate can exist as a form of 3D topological Dirac semimetal (3D TDS), a 3D counterpart to

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QUESTION WRITING



SPARK
Question Publishing
Collaboration Platform

CHALLENGES RESPONSES PUBLISHED CTWARDY

Search Responses by keyword, "ID #", or "@username"

See all Responses for this Challenge

Nuclear Energy

Topic Leader(s):
@ahoffman

Submitted by @saqibtq

Last updated on May 19, 2014 4:49:52 PM

2 / 12 fields locked

REQUEST FINAL REVIEW

REASSIGN CHALLENGE ASSIGN A LABEL REASSIGN AUTHOR

2 Revisions • No Comments • Instructions

1) Please type your question in the space below.

Will net electricity generation produced by nuclear energy in the U.S. be greater than that produced by natural gas or coal by the end of 2020?

MAKE CHANGES MAKE COMMENT AND VIEW REVISIONS

No Revisions • No Comments • Instructions

2) Please enter a short name/text version of question (50 characters or less).

Electricity generation from Nuclear Power in U.S.

MAKE CHANGES MAKE COMMENT AND VIEW REVISIONS

No Revisions • No Comments

3) What type of question is this?

Binary (Yes/No) or Multiple Choice

MAKE COMMENT AND VIEW REVISIONS

COMMENTS

TIP: Use @firstname.lastname to alert someone about your comment. For example: Hey @threeenergy check the out somewhat misleading to compare primary energy when you're comparing fuels used for electricity: net generation is the more appropriate comparison. The only reason

3 months ago
@saqibtq | @ahoffman | I see. However nuclear energy hasn't seen much of an increase in size over the years. Judging from data from EIA, the number of operating units from 1998 to 2012 has been constant at 104, a

3 months ago
@ahoffman | @saqibtq | I'm familiar with thorium and molten salt reactors. There is probably a good question or two there, but over a fairly long time frame. Nothing happens quickly in nuclear energy. As to the AEO

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POLL: DRUG TO AID DEAF



When will the pharmaceutical industry produce a new drug to aid the deaf, by targeting the inner ear?

By December 31, 2016

Between January 1, 2017 and December 31, 2018

Between January 1, 2019 and December 31, 2020

Between January 1, 2021 and December 31, 2023

Between January 1, 2024 and December 31, 2027

Will not occur before January 1, 2028

RESOLUTION SOURCE

The question will resolve when the FDA approves a drug that targets the inner ear for the purpose of lessening or mitigating deafness and/or hearing loss in humans.

FINE PRINT

The drug must allow patients, clinically defined as deaf, to hear at a level greater than that of which they heard before.

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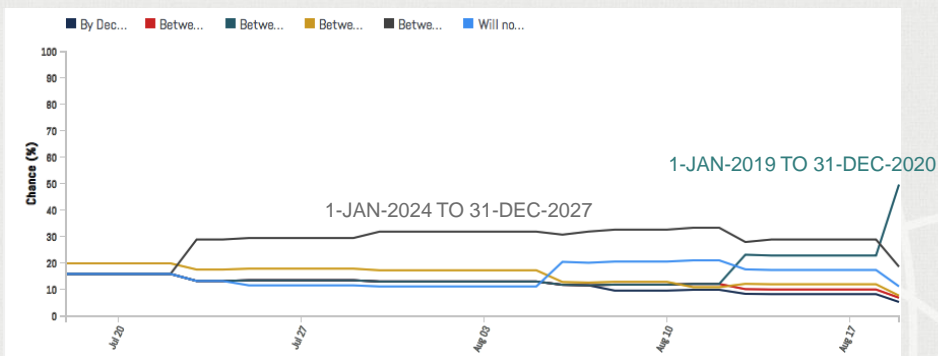
SCICAST FORECASTED RESULTS



When will the pharmaceutical industry produce a new drug to aid the deaf, by targeting the inner ear?

By December 31, 2016	5% Chance ⬇️ Down 3% today
Between January 1, 2017 and December 31, 2018	7% Chance ⬇️ Down 3% today
Between January 1, 2019 and December 31, 2020	50% Chance ⬆️ Up 27% today
Between January 1, 2021 and December 31, 2023	8% Chance ⬇️ Down 4% today
Between January 1, 2024 and December 31, 2027	19% Chance ⬇️ Down 10% today
Will not occur before January 1, 2028	11% Chance ⬇️ Down 6% today

TRENDS: INNER EAR



POLL: BATTERY TYPES



Which of the following battery types mentioned in the C&EN July 2014 issue will be the first to be used in an electric car sold by 2020?

Sodium-Ion (Na-ion)

Lithium Sulfur (Li-S)

Lithium Air (Li-air)

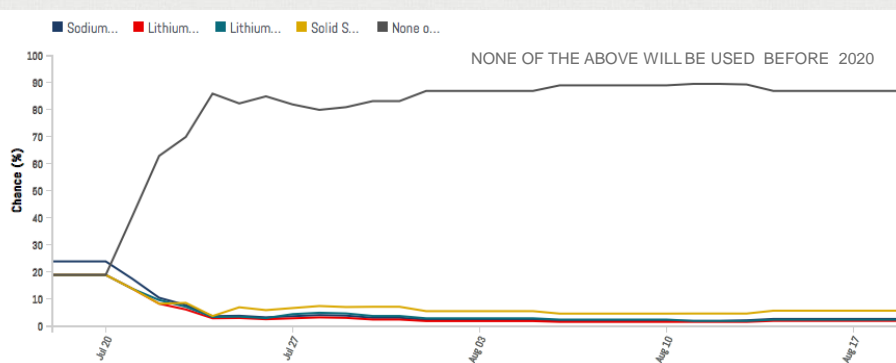
Solid State Lithium-Ion

None of the above will be used prior to 2020

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SCICAST FORECASTED RESULTS



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SCICAST FORECASTED RESULTS



Showing 1 of 1



ted

1. None of these technologies are even close to lithium ion.
2. Even if they were close, the technologies would take years to develop commercially.
3. It would also take years to test for safety and get government approval.
4. It would also take years to redesign/reoptimize battery control electronics for a new chemistry.
5. It would also take years for the supply chain and manufacturing practices to catch up to lithium ion.
6. It would also take years for the new battery industry to grow and reach the economies of scales that lithium ion is already at...

Basically, the only way that these will supplant lithium ion is if they are significantly better AND even then, it will take many years.

Definite "none of the above."

Written at 02:04 PM on July 31 2014

INTERESTED?



You can help us measure and improve
S&T forecasting

Forecast

- Sign up at <https://scicast.org>
- Search, specialize, update
- Watch for incentives & other events
- Host an "advanced" seminar on trading strategies

Write new questions

- Register for Spark at <http://spark.scicast.org>
- Work with research team to refine questions
- Longer-term questions
- Questions can be public or private

If there is another potential application of the prediction market technology, contact the research team!

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PUBLICATIONS & PRESENTATIONS



Karvetski, Christopher W., Kenneth C. Olson, David R. Mandel, and Charles R. Twardy. 2013. Probabilistic Coherence Weighting for Optimizing Expert Forecasts. *Decision Analysis* 10 (4): 305–26. doi:10.1287/deca.2013.0279. <http://pubsonline.informs.org/doi/abs/10.1287/deca.2013.0279>.

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Olson, K. et al. 2014. Interval elicitation of forecasts in a prediction market reveals lack of anchoring 'bias'. MIT CI 2014.

Sun, W. et al. 2014. Trade-based asset modeling using dynamic junction tree for combinatorial prediction markets. MIT CI 2014.

Twardy, C. 2014. SciCast: Collective Forecasting of Science and Technology. 5eyes Analytic Workshop. Oxford, MS. 25 March.

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Hanson, R. 2014. Presentation and discussion of prediction markets and SciCast. Potomac Institute CREST Seminar, 30 Jan.

Karvetski, C.W. 2013. Statistically improving prediction market forecasts. The Annual Meeting of the Society for Risk Analysis, Baltimore, MD.
Olson, K.C. Improving expert judgment by coherence weighting. The Annual Meeting of the Society for Risk Analysis, Baltimore, MD.
Olson, K.C., C.W. Karvetski. 2013. Analyzing Competing Intelligence Hypotheses with Belief Network Sharing. Intelligence Community Postdoctoral Research Conference, Washington D.C.

Karvetski, C.W., K.C. Olson. 2013. Optimizing Expert Forecasts with Probabilistic Coherence. Intelligence Community Postdoctoral Research Conference, Washington D.C.

Olson, K.C. Best practice for eliciting and weighting incoherent judgments. Society for Judgment and Decision Making, Toronto, ON, Canada

Powell, W.A., Hanson, R., Laskey, K.B. and Twardy, C. 2013. Combinatorial Prediction Markets: An Experimental Study.

Proceedings of the Seventh International Conference on Scalable Uncertainty Management (SUM 2013). Alexandria, VA, September.

Twardy, C. Overview of ACE & DAGGRE lessons learned. Teaching & Researching Intelligence panel. Global Intelligence Forum. July 20, Dungarvan, Ireland

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Hanson, R. 2013. Bayes Net Based Combinatorial Prediction Markets. Prediction engines panel. Microsoft Research Faculty Summit. 15 July 2013. Redmond, WA.

----- Also presented to Microsoft Research New York. 18 July 2013.

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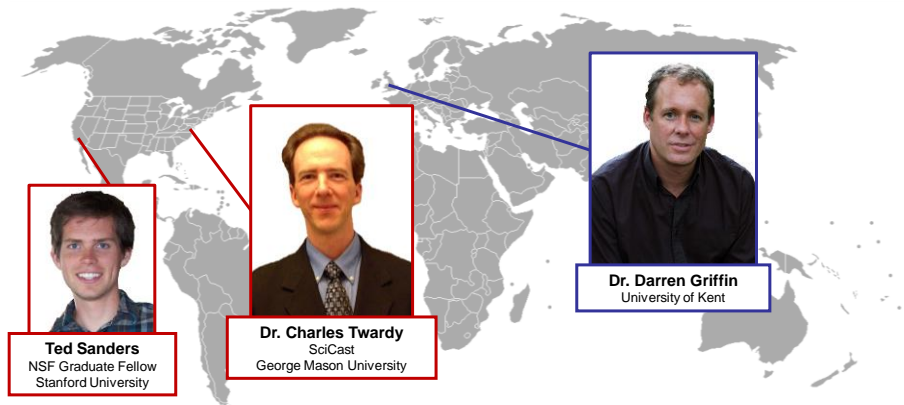
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