iCRAG
IRISH CENTRE FOR RESEARCH
IN APPLIED GEOSCIENCES

Mining and Society – Let’s Talk Science Festival 2020
14th November 2020
Scan this QR code to join
Let's Meet the Scientists!

Elspeth Wallace

- **Job**: iCRAG’s Education and Public Engagement Officer.
- **Expertise**: Studied geology and palaeontology
- **Favorite Geological Experience**: Digging up gigantic dinosaurs in Wyoming.
Let's Meet the Scientists!

Helen Twigg

- **Job:** Researcher in iCRAG’s Earth Resources Division
- **Expertise:** Field and Exploration Geology
- **Favorite Geological Experience:** Gets to travel all over the world exploring for new sources of metal
Let's Meet the Scientists!

Danny Hnatyshin

• **Job:** Researcher in iCRAG’s Raw Materials Division

• **Expertise:** Figuring out how old rocks are and how they formed!

• **Favorite Part of my Research:** I get to work in the field, in a chemistry lab, with computers, and scientific instruments! Never Boring!
Today’s Workshop

• In today’s workshop we will be examining the interlinks between mining and society.

• We ask that you
  • Maintain an open mind
  • Participate! Use your phone to submit answers and follow along
  • Ask questions – use the question function using the app (bottom of the screen), or through the zoom function
  • Have fun

• At the end of the session we will have time to answer some of the most popular and interesting questions!
Warm up question! How do you feel about the topic of mining and society?

- Good! I know lots. 0%
- Meh, I'm not sure about it. 0%
- I don't really know anything. 0%
Let’s get started!

Think about your everyday life.
What technologies are essential to your normal daily life? Let's list them.
Some of the things we thought about

- Phone
- Television
- Batteries
- Laptop
- Transport
Do you know what natural resources go into these technologies?
Lead  Lithium  Cobalt

Important for batteries!
Iron and Zinc are important for buildings.
Are you surprised by what these natural resources look like?

- Yes
- No
Ok let's link natural resources to a smart phone.
Might not seem like much but it depends how many phones we have!
How many phones do you think we produce every year?

- 100 thousand
- 1 million
- 100 million
- 1 billion
- 100 billion
That’s quite the tower of phones!
So we will end up needing a lot of resources for all those phones

1500 Gold Bars!

Enough Copper for the Eiffel Tower
What comes into your head when you think of mining?
The Legacy of Mining

Mining in the past, quite rightly, did not have a good reputation

Mining today is very different
Modern mining regulations - did you know?

- Rehabilitation plans & funds
- Baseline environmental and social studies
- Environmental monitoring
- Health & safety regulations
- End of mine life staff training
How have things changed – social responsibility

Lisheen mine, Ireland (1999-2015)

Navan mine, Ireland (1977 - present)

European mining

CLEANER, SAFER, ENVIRONMENTALLY RESPONSIBLE
But that’s not to say there aren’t still problems...

**Unregulated mining in failed states can cause:**

- environmental problems
- poor labour practices
- health & safety risks
- entrench social inequality
- fund civil war
...and in a global economy the world is your backyard.
Can you think of a way we can interrupt this system?
But what about recycling?

- We aim to improve the circular economy
Do we recycle 100% of our materials? How many old electrical items do you have hiding in a drawer/cupboard?
Can you think of any reasons why we can't get all our materials from recycling?
The Limitations of Recycling:

World Bank 2020

- Total Demand
- Supply from scrap: scale up to 100% EOL RRR by 2050
- Supply from scrap: current rates

Primary aluminium demand after 100% EOL recycling rates

Secondary aluminium will meet 61% of demand in 2050 under 100% EOL recycling rates
The Future

What does our future look like and what role does mining play?
We want a sustainable future!
What is a sustainable future?

We want to limit our current and future impact on the environment!

We want to improve our standard of living through all of this!
What are the biggest challenges to earth and society when we think about our sustainable future?
Locations of minerals

- These are minerals that the EU deems ‘critical’
- A mineral is ‘critical’ when it is essential for society
Low carbon energies

World Bank, 2020

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<th>Wind</th>
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How does European mining fit in?

- We can mine our own supplies for the green technologies we need.
- Finding local supplies reduces the greenhouse gasses produced by transporting supplies to us.
- Europe has amazing environmental protection laws and human rights.
Ireland is a world leader!

Key Effects of Lisheen Mine

- **1999**
  - Mine opens
  - Zinc and lead: 4.8 million tonnes of zinc and lead concentrate produced, 30% of Irish zinc and lead production
  - Skills: €500,000 invested in training and skills development each year
  - Community: Upgrade of local roads, water, power and telecommunications, investment in local sports and community facilities
  - Farmland: 40% of farmland changed to industrial use
  - Energy Use: Equal to 6.650 households, 76,737 tonnes of CO2 each year
  - Renewable Energy: Development of 60 MW wind farm with enough energy for 14,300 households, 120,000 tonnes of CO2 saved per year

- **2015**
  - Mine closes
  - Key Figures: €2.8 billion Revenue of mine, €1.3 billion Gross Value Added to the Irish economy, €5.8 billion Direct, indirect and induced spending, €257 million Paid in royalties, taxes and rates
  - 350 Direct jobs created, 74% Workers living within 30 km, 493 Additional jobs in the wider economy

- Mine closure and site restoration
- Carrick Hill wetlands

- Upgraded infrastructure
- Upskilled workforce
- Bioeconomy Research Campus
Where else could we mine resources?
Space Mining

Is space mining the eco-friendly choice?
Natural resources are being depleted on Earth. But some think outer space may be a vast reservoir that’s ripe for tapping.

The global race to mine outer space

Special Report
Space Mining
The costs run high and the returns are not immediate but extraterrestrial mining is now within the realms of the probable. Beyond gaining access to precious commodities, many in the space industry see such ventures as leading to further exploration of outer space.
Deep Sea Mining

How minerals could be mined from the seabed

- Production support vessel
- Return pipe
- Riser pipe

Cobalt crusts
Seafloor massive sulfides
Polymetallic nodules

- Localized sediment plates from curving
- Massive sulfide deposit
- Sediment
- Nodule deposit
- 800-3,500 metres deep
- 1,000-4,000 metres deep
- 4,000-6,500 metres deep

Rejected mining material is pumped back into the water.
Reduce the mining footprint

In-situ extraction of uranium at the Crow Butte deposit, Nebraska

In-situ extraction of copper at the Florence deposit, Arizona
What other improvements can we make?

- Become better at recycling!
- Find new and exciting sources of materials
- Develop technologies to help us get the most out of our materials!
- Mine new and exciting places
Do you think a sustainable future is achievable?

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<td>Yes</td>
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<td>Maybe, but we'll have to change some things</td>
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Conclusions

- Our society is reliant on natural resources, and will become more and more desperate for resources in the future
- We must produce natural resources to satisfy demand
- Ireland is a leading player in clean, safe mining
- If we work together, we can support the circular economy and create a sustainable future for our society and planet

One last question for you, then it’s time for you to question us!
Let's think back, what pops into your head now when you hear the word mining?
Ask me anything!

Top questions

- Pinned
- Newest
- Oldest
- Answered

There are no unanswered questions.