

# “Dark Research”



# Dark Research

Unwritten skills, attitudes and knowledge which are often significant factors in successful research, yet are rarely covered by formal graduate university curricula.



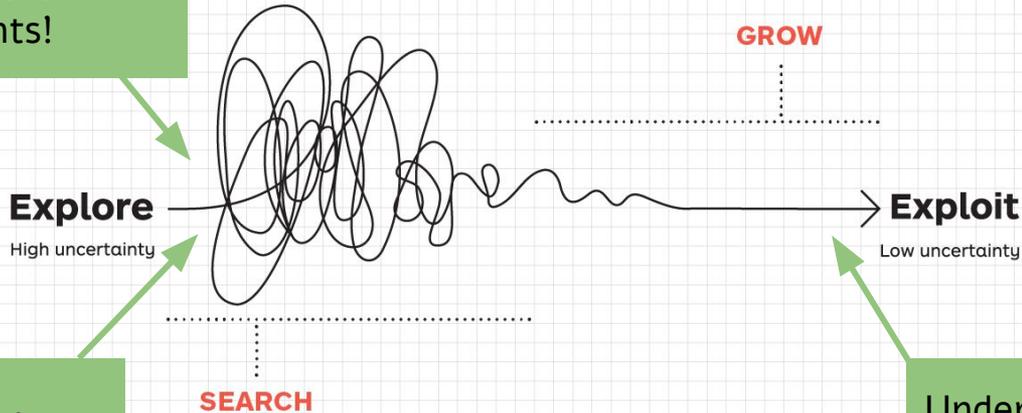
## Uri Alon on innovation in science



# “Nobody told us about it!”

No one tells you, but moving from undergrad to research is a paradigm shift

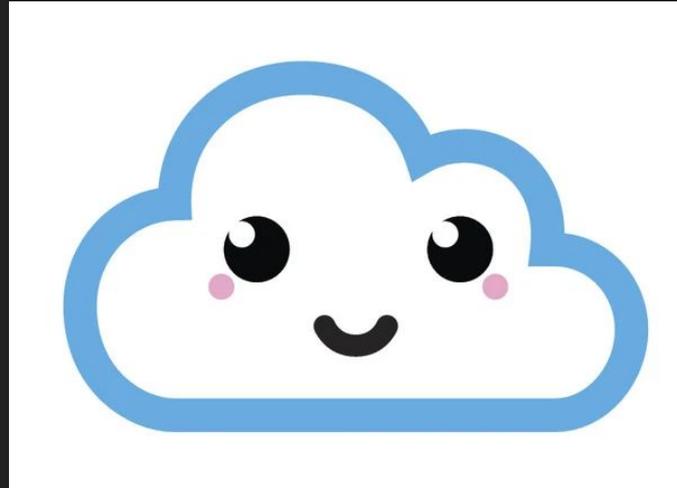
For many mentors: “not one hour” on how to explore unknown with students!



Much of your research career (esp. earlier parts)

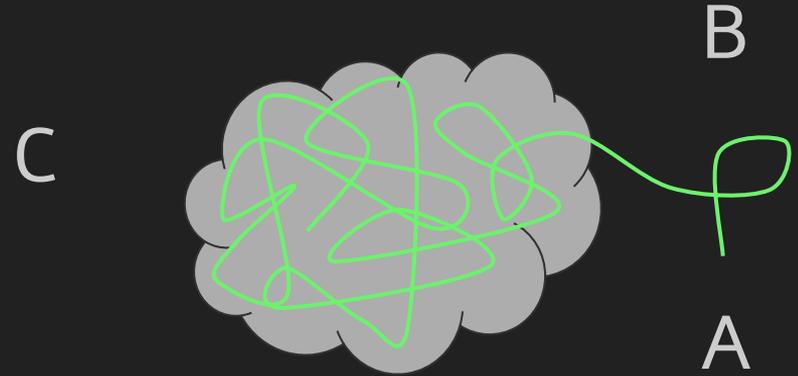
Undergrad university courses taught by professors in “exploit” phase

# Joining the Cloud Appreciation Society



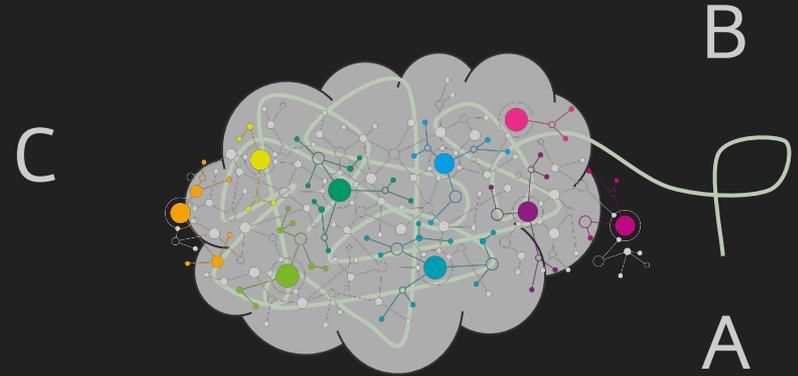
# Into the cloud

1. **Exploration:** methods and tools for mind opening



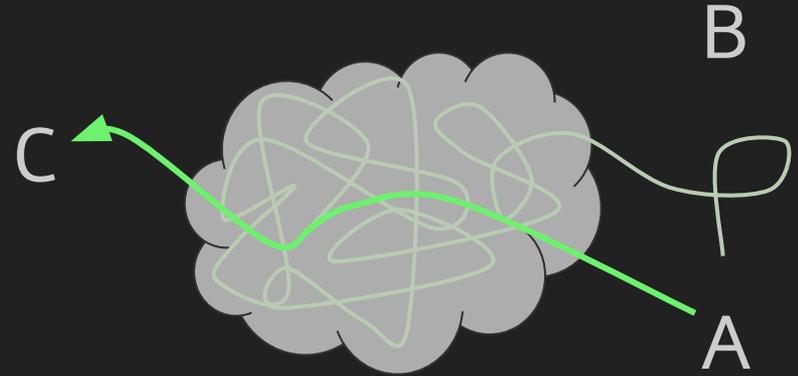
# Into the cloud

1. Exploration: methods and tools for mind opening
2. **Cloud Maintenance:** reference & project management



# Into the cloud

1. Exploration: methods and tools for mind opening
2. Cloud Maintenance: reference & project management
3. Retracing your steps: reproducibility, experiment management



# Into the cloud

1. Exploration: methods and tools for mind opening
2. Cloud Maintenance: reference & project management
3. Retracing your steps: reproducibility, experiment management
4. **Social Science: forging connections and collaborations with the wider scientific community**



# 1. Exploration

“A month in the laboratory can often save an hour in the library”  
-- Frank Westheimer



# Reading up

## Undergrad

Read just as much as needed to solve HW

Write a lot (code assignments, math exercises, etc)

## Graduate

Read a lot (and podcasts etc), journey out of comfort zone!

Code and exercises pragmatically (deriving gradients by hand for your new architecture is educational but likely not necessary)

Conferences, internships, seminars

# Tracking Research



- Google/Semantic Scholar alerts
- [Semantic Sanity](#)
- Academic Twitter

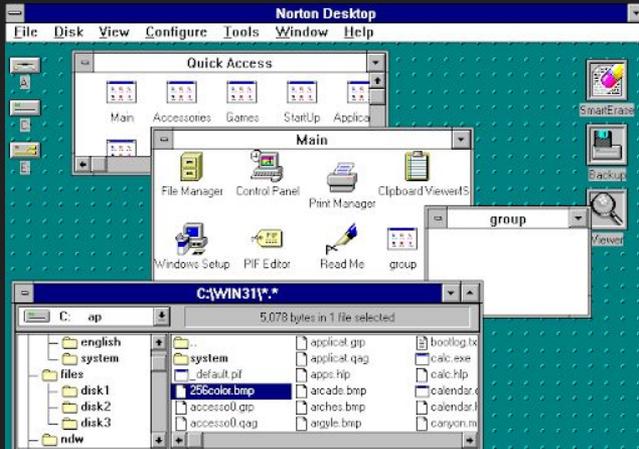


## 2. Cloud Maintenance



Tired

Hierarchical file storage

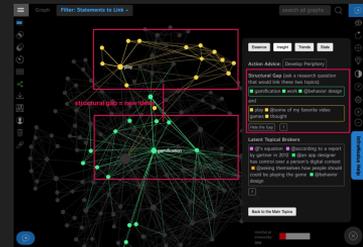


Wired

Workflow management

Tools for thought

- Notion
- Roam
- Obsidian
- ...

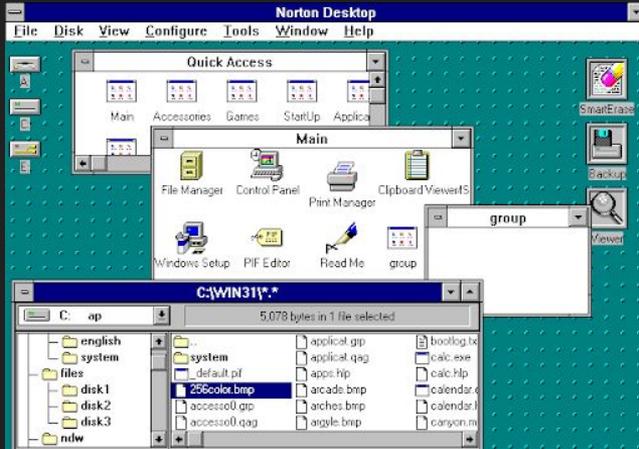


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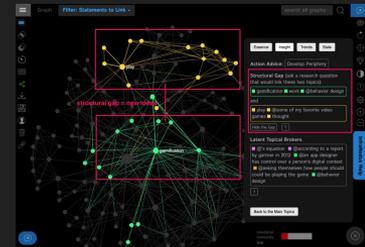


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# Workflowing

- Tasks
- References
- Talks & Conferences
- Projects
- Meetings
- Experiments

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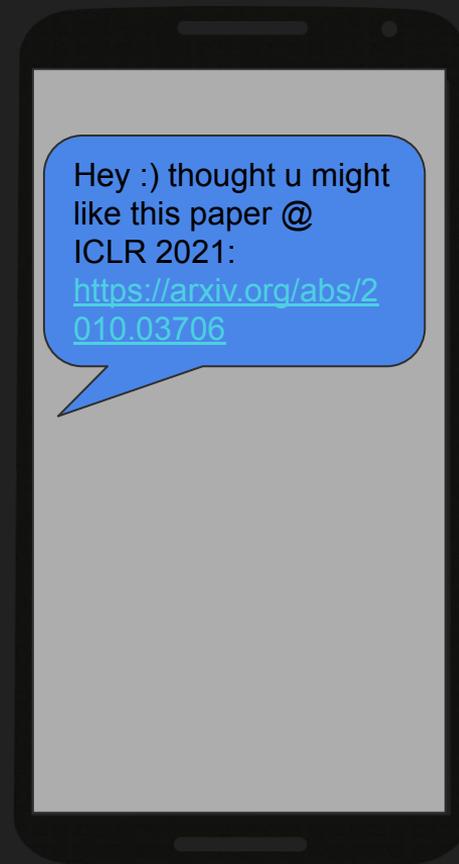


“Please let me know by Thursday if you’re willing to be a reviewer for EMNLP”

([Notion link](#))

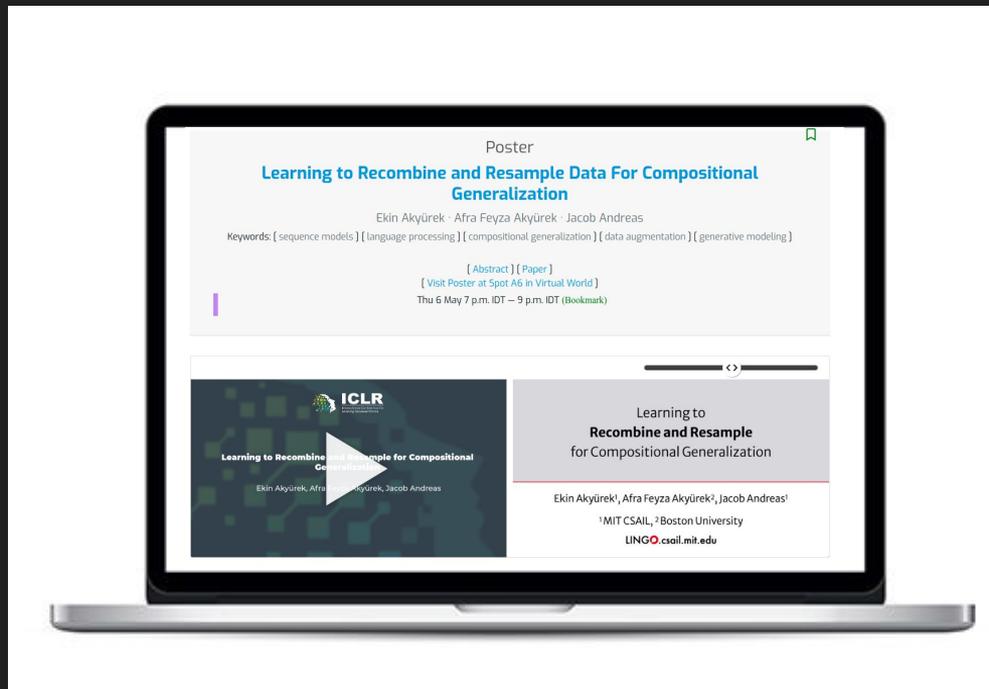
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([Notion link](#))

# Workflowing

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“Please prepare a project roadmap for next meeting.”



([Notion link](#))

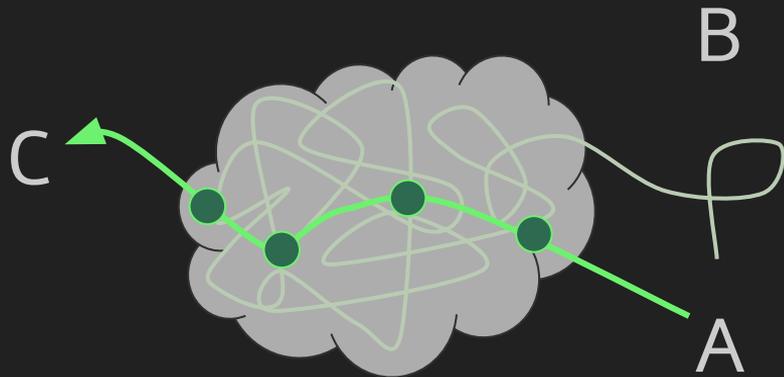
# Workflowing

- Tasks
- References
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### 3. Code and experiment management

Goal: effortless tracking + reproduction of experimental results

- Metrics
- Data
- Models





# Weights & Biases: one stop shop + peace of mind



Enables single unified API for data, model and metrics usage + tracking

> Data:

```
> python prepare_dataset.py --in_dir=source_data  
--wandb_name=my_wandb_train_data
```



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> Model:

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> python train_model.py  
--wandb_data=project_name/my_wandb_train_data  
--wandb_model_save_name=my_model_wandb
```



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```

## > Metrics:

```
> python eval_model.py  
--wandb_data=project_name/my_wandb_eval_data  
--wandb_model_load_name=my_model_wandb
```

# Code Management

Isn't that what we did a degree in CS for?



Well, yeah.. But there are always helpful new tips, tricks & best practices

- Unit tests (pytest, etc)!
- Open-source worthy code & documentation (at least sometimes...)
  - ◆ [Papers with code](#)

## 4. Social Science

- Academic web-page
- Twitter profile



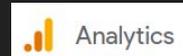
# Academic Webpage

Many simple & free options:

- [Hugo Academic](#) + GitHub Pages
- [Notion](#)
- Uni. hosting?
- ...

Think of it as your portfolio/CV, aim to create quality publishable content for it (papers, blog posts, talks, implementations, etc)

Google Analytics for tracking page traffic!





# Academic Twitter

Requires some investment & anti-doomscrolling potion...



But can blow your mind, expand your horizons and prospects (IMO)

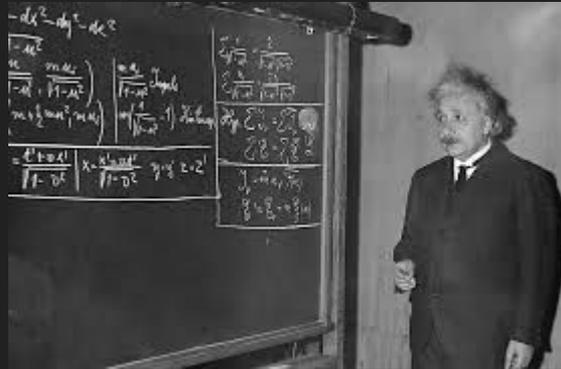


- Internship Opportunities
- Academic networking & collaboration
- Recommendations
- ...

# Collaborate often



In today's hyper-networked world, and **\*especially\*** in cross-disciplinary fields like natural language, idea of lone genius is less and less tenable



# Collaborate often



Yet collaboration is often undervalued and under-nourished...

“If you asked me about one of the blind spots of the 20th century, that would be one of the biggest. **We have not yet learned how to collaborate in deep ways that would actually take advantage of the differing kinds of gifts and capacities that people have...**”

“Many people have had the experience of glimpsing the ways in which collaborative work can sometimes produce a much more stunning result than anyone could have done on their own. But for the most part, the whole way in which universities are structured means **you have a couple of thousand extraordinarily gifted people all living largely independently of each other**, which, if you looked at it as [someone] from another planet, is really absurd. But no one sits around each day and says this is the most ridiculous arrangement I can think of.”

-- Robert Kegan (Harvard psychologist), “Grabbing the Tiger by the Tail” (2000)

# “Yes and” Research

When in doubt... improvise!



Check out [talk notes](#) for Notion templates, full list of sources



## Dark Research Talk Notes

📅 Date May 4, 2021

∨ 6 more properties

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**Templates:** 📄 ↗ [Notion for Research Management Demo](#)

**Blog post:** 🔍 ↗ [Managing Research in Notion](#)

### List of sources

- ▶ Exploration & reference management
- ▶ Tools for thought, project management
- ▶ Code, reproducibility and experiment management
- ▶ Social Science