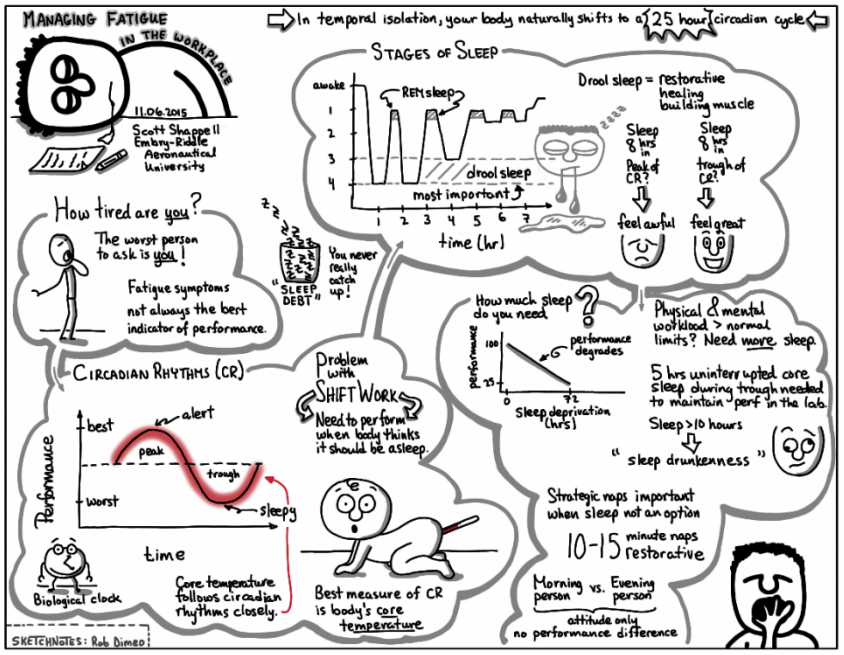
Sketchnotes

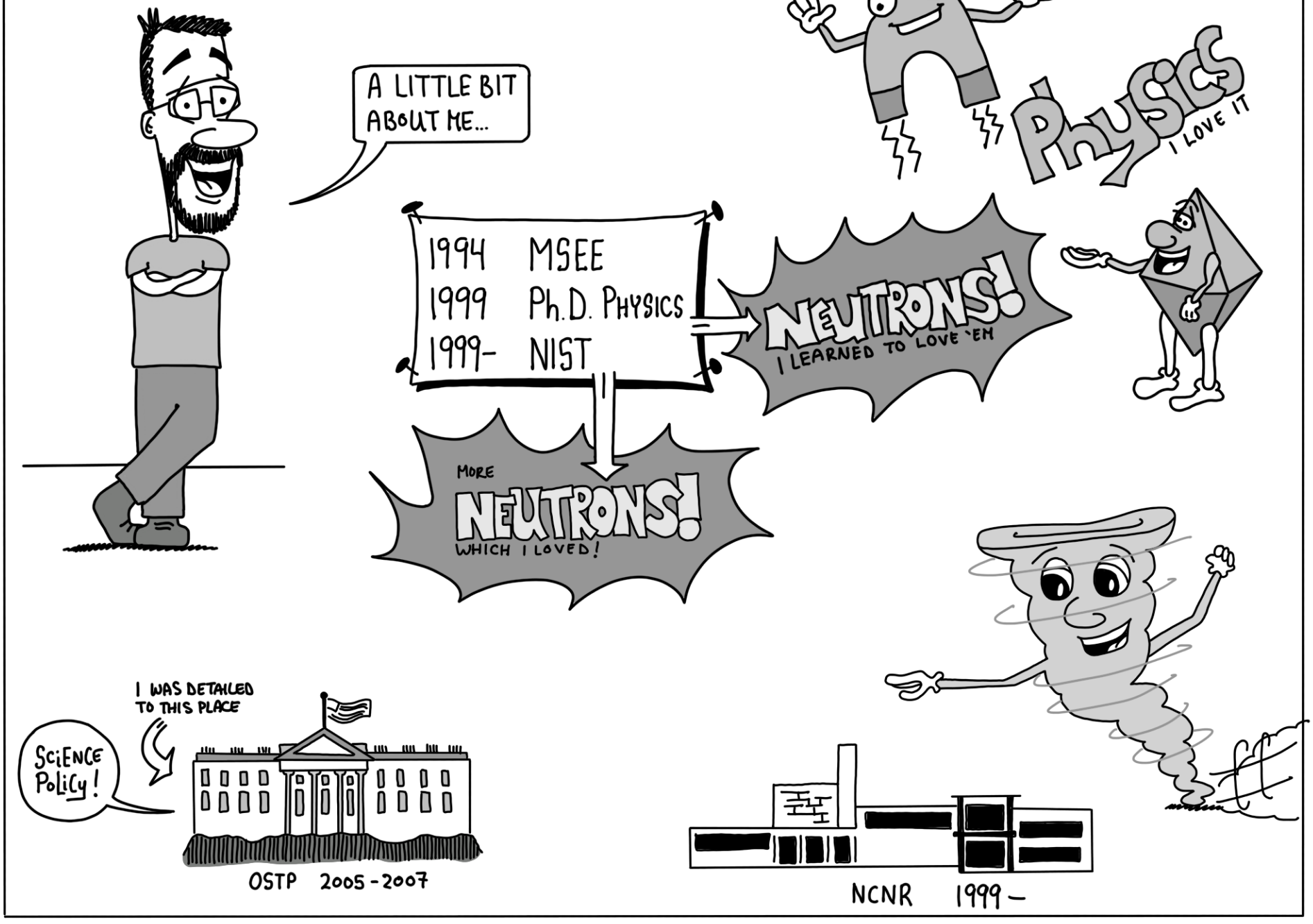
a one-page visual summary of just about anything



eidetic memory

“I like to read,
and once I read something,
I understand it,
and once I understand it,
I never forget.”

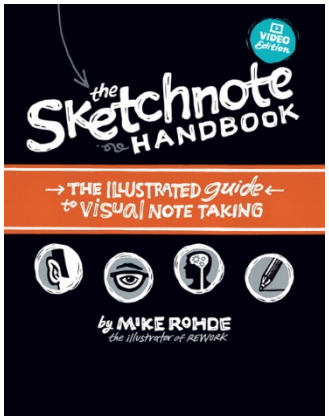
http://www.usanetwork.com/suits/photos/mike-ross


A LITTLE BIT ABOUT ME...
1994 MSEE
1999 Ph.D. PHYSICS
1999- NIST
PHYSICS I LOVE IT
NEUTRONS! I LEARNED TO LOVE 'EM
MORE NEUTRONS! WHICH I LOVED!
I WAS DETAILED TO THIS PLACE
SCIENCE POLICY!
OSTP 2005-2007
NCNR 1999-

WHAT ARE SKETCHNOTES?

"... RICH VISUAL NOTES CREATED FROM A MIX OF HANDWRITING, DRAWINGS, HAND-DRAWN TYPOGRAPHY, SHAPES, AND VISUAL ELEMENTS LIKE ARROWS, BOXES AND LINES."

-MIKE ROHDE
THE SKETCHNOTE HANDBOOK



Rebeca Zuñiga @rebezuniga

VisualNotes by: @RebezUNIGA | 07.10.2015 | @:BY

7 TENETS of CREATIVE THINKING

Michael Michalko

EDUTOPIA

YOU ARE CREATIVE

I'M Creative

Creative people BELIEVE they are creative.

"IN school, we learn about geniuses and their ideas, but how did they get those ideas?..."

CREATIVE THINKING IS WORK

Passion +
Determination +
Patience +
Perseverance +

YOU MUST GO THROUGH THE MOTIONS

Activate your Brain

YOUR BRAIN IS NOT A COMPUTER

"The brain thrives on creative energy that results from experiences, real or fictional"

THERE IS NO RIGHT ANSWER

"The only certainty in life is uncertainty."

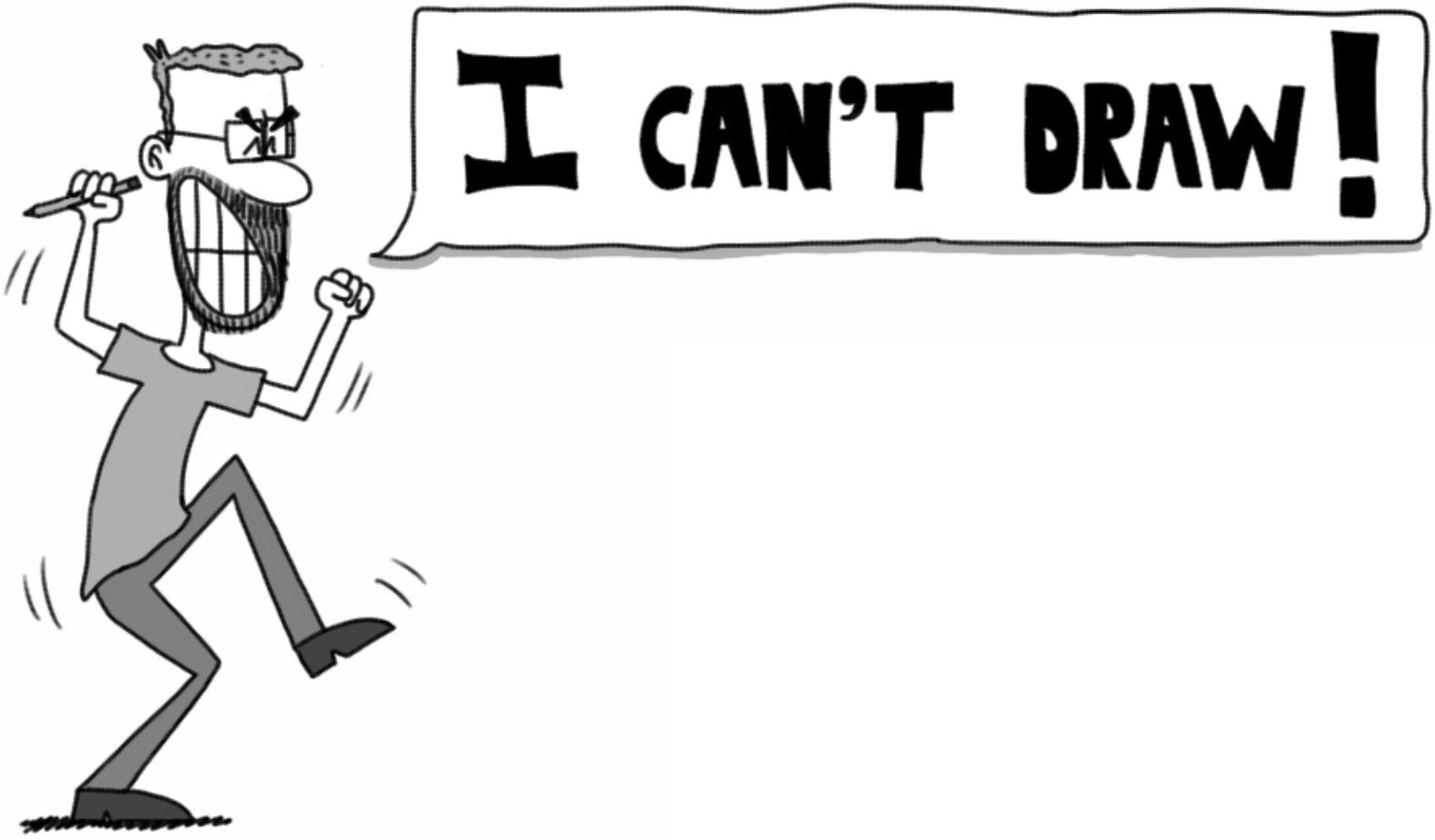
THERE IS NO SUCH THING AS FAILURE

- What have I learned about what doesn't work?
- Can this explain something that I didn't set out to explain?
- What have I discovered that I didn't set out to discover?

YOU DON'T SEE THINGS AS THEY ARE - YOU SEE THEM AS YOU ARE

"You construct your reality by how you choose to interpret your experiences."

https://creativecommons.org/licenses/by/2.0/


I CAN'T DRAW!

I CAN'T DRAW!

WELL...

MAYBE NOT AS WELL AS I'D LIKE TO DRAW.

THAT'S MORE LIKE IT

YOU
THAT THING YOU WERE AFRAID OF

ILLUSTRATED INSPIRATION:

AN HOMAGE TO THE SIMPLE & ELEGANT ILLUSTRATION STYLE OF

ANNIE VALLOTTON

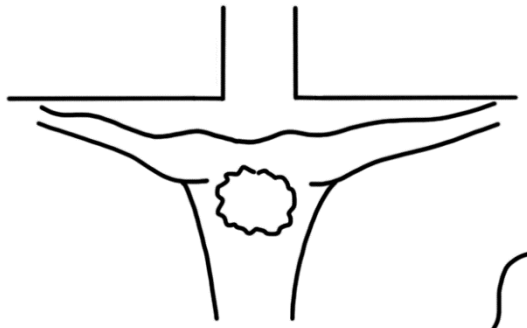
b. FEBRUARY 21, 1915
d. DECEMBER 28, 2013

510
ILLUSTRATIONS

THE VERSION
I GREW UP WITH

I LOVE HER SIMPLE
AND EXPRESSIVE STYLE

TO THIS DAY, WHEN I
HEAR ANY READING FROM
THE BIBLE, I SEE THE
STORY THROUGH HER FIGURES



IT TOOK ME A LONG TIME
I MUST SAY, I DIDN'T WANT
TO HAVE ILLUSTRATIONS WITH
MANY LINES. THIS IS WHY I DID
SOME OF THE DRAWINGS 80-90
TIMES BEFORE I ACHIEVED THE
ONE I WANTED. I WANTED TO
SIMPLIFY THEM THE MOST I
COULD.

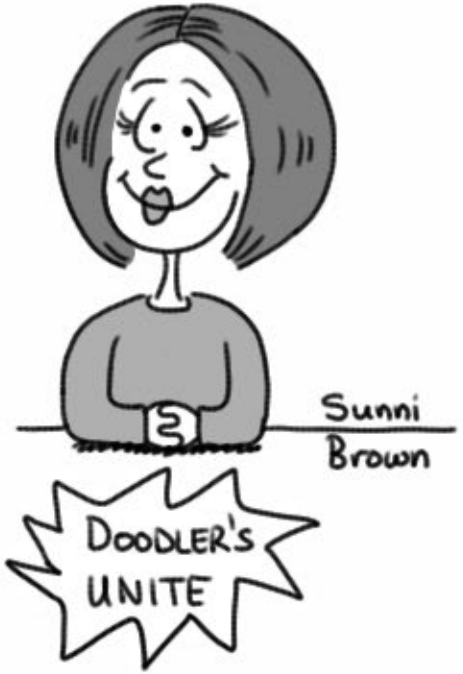
I WANTED TO GET TO
THE TRUTH... THE MOST
IMPORTANT THING! -AV

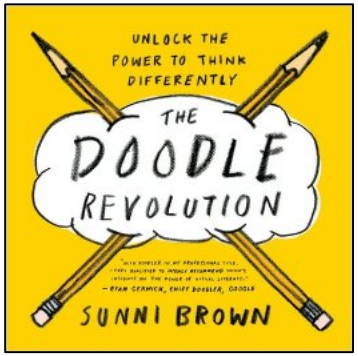
Rob Dix 04.16.2016

Why Sketchnote?

(or doodle in your notes)

1. HIGH LEVEL OF COMPREHENSION AFTER THE EVENT
2. INCREASED RETENTION & RECALL (WEEKS, MONTHS LATER)
3. INCREASED CREATIVITY
4. ENHANCED LISTENING SKILLS





THE DRAWING EFFECT

EVIDENCE FOR RELIABLE AND ROBUST MEMORY BENEFITS IN FREE RECALL

Jeffrey Wammes, Melissa Meade, and Myra Fernandes (2016), The Quarterly Journal of Experimental Psychology, 69:9, 1752-1776, DOI: 10.1080/17470218.2015.1094494

DOES DRAWING IMPROVE MEMORY?

WHAT WAS THE QUESTION? I FORGOT TO DRAW IT. (GROAN!)

7 EXPERIMENTS*

1 GROUP 1A - DRAW WORD
GROUP 1B - WRITE WORD

HOW MANY WORDS CAN YOU REMEMBER?

INDIVIDUALS

⇨ DRAWN WORDS RECALLED BETTER THAN WRITTEN WORDS

2 SAME AS 1 BUT IN A LARGE GROUP

⇨ DRAWN WORDS RECALLED BETTER THAN WRITTEN WORDS

⇨ DRAWING COULD BE USEFUL IN A CLASS-ROOM SETTING

3 SAME AS 2 BUT ADD ANOTHER GROUP THAT LISTS CHARACTERISTICS OF THE WORD (VS. DRAWN VS. WRITTEN)

THE LIST OF SEMANTIC CHARACTERISTICS IS A WAY TO COMPARE DEEP LEVEL OF PROCESSING

⇨ DRAWN WORDS RECALLED BETTER THAN WRITTEN WORDS AND THOSE BASED ON LISTS OF CHARACTERISTICS

4 SAME AS 2 BUT ADD A GROUP THAT VISUALIZES A MENTAL PICTURE OF THE WORD.

"BALLOON"

⇨ DRAWN WORDS RECALLED BETTER THAN WRITTEN WORDS AND THOSE BASED ON MENTAL IMAGES

5 SAME AS 2 BUT ADD A GROUP THAT VIEWS A PHOTO OF THE OBJECT

"PICTURE SUPERIORITY" NOT AS GOOD AS DRAWING

⇨ DRAWN WORDS RECALLED BETTER

6 SIMILAR TO 1 BUT SHORTENED TIME TO DRAW OBJECT AND LISTS OF WORDS INCREASED + INTENTIONAL ENCODING

⇨ DRAWING ENCODING STRATEGY MAY BE EVEN MORE POTENT AT SHORTER ENCODING DURATIONS

7 SAME AS 6 BUT SUBJECTS RANDOMLY ASSIGNED TO WRITE ALL WORDS OR DRAW ALL WORDS

⇨ DRAWN WORDS RECALLED BETTER

⇨ "DISTINCTIVENESS" OF HOW A PARTICULAR OBJECT IS ENCODED CANNOT FULLY EXPLAIN WHY DRAWING IS SO GOOD FOR RECALL

CONCLUSIONS

DRAWING PICTURES OF WORDS YIELDS MEASURABLE BOOST TO LATER MEMORY PERFORMANCE

DRAWING EFFECT | BETTER THAN →
- WRITING WORDS
- LEVEL OF PROCESSING
- MENTAL IMAGERY
- PICTURE SUPERIORITY

DRAWING EFFECT = ELABORATION + VISUAL IMAGERY + MOTOR ACTION + PICTORIAL REPRESENTATION

*SEE PAPER FOR IMPORTANT EXPT DETAILS!

04.26.2016 SKETCHNOTE:

MY 30-DAY SKETCHNOTE EXPERIMENT

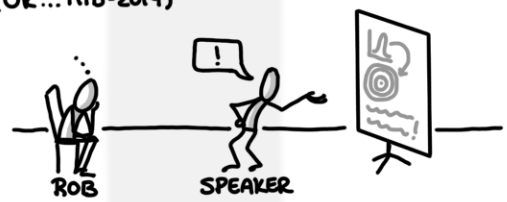
$#&* I CAN'T DRAW!

BABY STEPS

A PERSONAL ACCOUNT BY ROB DIMEO • 05.03.2016

ONCE UPON A TIME...

(OK... MID-2014)



I HAD BEEN ATTENDING MANY TECHNICAL TALKS AND, IN SPITE OF TAKING NOTES, THEY SELDOM HAD A LASTING EFFECT. THE CONTENT OFTEN DIDN'T STICK FOR MORE THAN A COUPLE OF DAYS AT BEST.

SO I SEARCHED THE WEB ON NOTE-TAKING METHODS.

WHEN I FOUND VISUAL NOTES AND SKETCHNOTES, I STOPPED.

SO I GOT THE SKETCHNOTE HANDBOOK BY →

MIKE ROHDE

IT LOOKED LIKE I MIGHT BE ABLE TO DO IT

I THINK I CAN DO THIS...

I TRIED IT FOR A TED TALK AND – THOUGH I DIDN'T LIKE MY DRAWINGS – I LIKED THE "DOING" OF IT.

AFTER UNDERSTANDING THAT IT INVOLVED DEVELOPING CERTAIN SKILLS LIKE

- → RAPID DOODLING
- → FOCUS
- → ACTIVE LISTENING
- → SYNTHESIS & ANALYSIS IN REAL-TIME

I COMMITTED TO 30 DAYS OF....

NUTHIN' BUT SKETCHNOTES

FOR 30 DAYS I MADE 1-PAGE SKETCHNOTES...

(...NOT JUST TECHNICAL TOPICS... →EVERYTHING←).

...OF SCIENTIFIC PUBLICATIONS

EXCELLENT PRACTICE FOR TECHNICAL TALKS!

...AT MANAGEMENT MEETINGS

...OF SAFETY INCIDENTS

...ON POLICY & REGULATION

...ON PERFORMANCE MANAGEMENT ✓

...AND OF COURSE TECHNICAL PRESENTATIONS

OUTCOME AFTER 30 DAYS?

1. DEVELOPED VISUAL VOCABULARY FOR MULTIPLE TOPICS
2. IMPROVED RAPID DOODLING
3. IMPROVED LISTENING
4. BETTER RECALL
5. RE-READ MY NOTES
6. INCREASED ENGAGEMENT
7. ENHANCED COMPREHENSION

AND I HAVE BEEN SKETCHNOTING EVER SINCE.

Why I Sketchnote

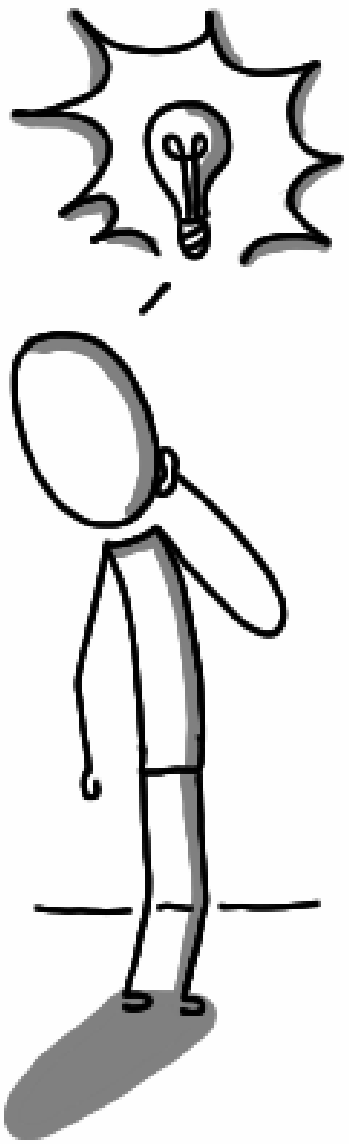
1. Improved scientific understanding via talks & publications

2. I am a visual thinker. Visual appeals to me.

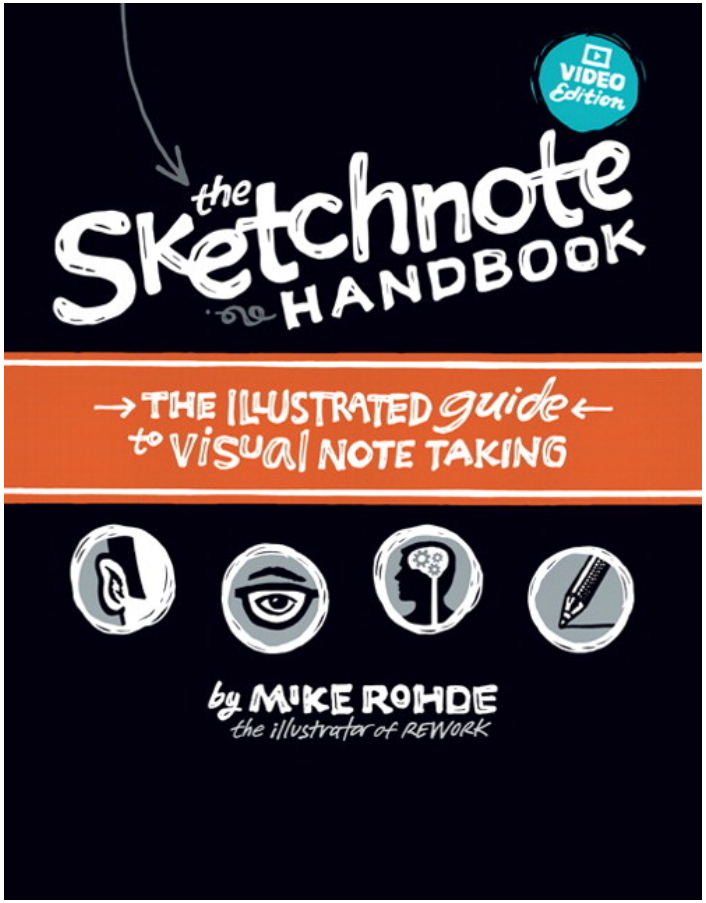
3. Visual notetaking engages mind and body to process verbal & visual information. More so than conventional notes.

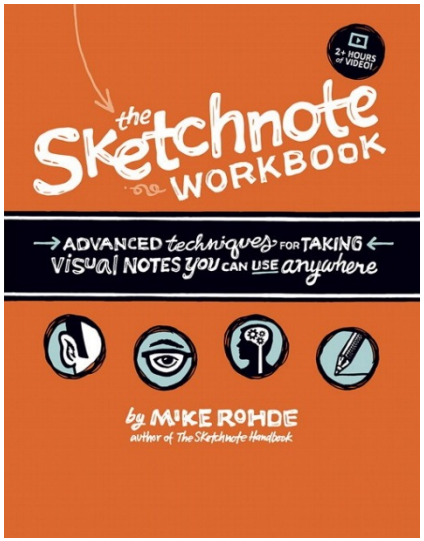
4. One-page visual summary can be used later for quick reference. Details recalled easier.

5. A Sketchnote is a visually appealing artifact. High re-read value.



INSPIRATION


VIDEO Edition
the Sketchnote HANDBOOK
→ THE ILLUSTRATED guide ← to VISUAL NOTE TAKING
by MIKE ROHDE
the illustrator of REWORK


2+ HOURS of VIDEO!
the Sketchnote WORKBOOK
→ ADVANCED techniques FOR TAKING ← VISUAL NOTES you CAN USE anywhere
by MIKE ROHDE
author of The Sketchnote Handbook

Mike Rohde

TED

DAVE EGGERS

826 VALENCIA

DAZED in BROOKLYN

Around tenders — inspiring STRUGGLES: students who have learning disabilities

UNDERFUNDED

CLONE THE TEACHERS!

FRIENDS IN WRITING

Connect them w/ students?

PIRATE SUPPLY SHOP

map head drop

McSweeney's

FREE TUTORING

trust gap?

you're tutoring behind a pirate supply store, dude!

1:1 RATIO

40 HRS

SCHOOL in a way

Integrated Learning

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@xlontrax

Mauro Toselli, Chief Operating Sketchnoter at sketchnotearmy.com

Carolyn Sewell

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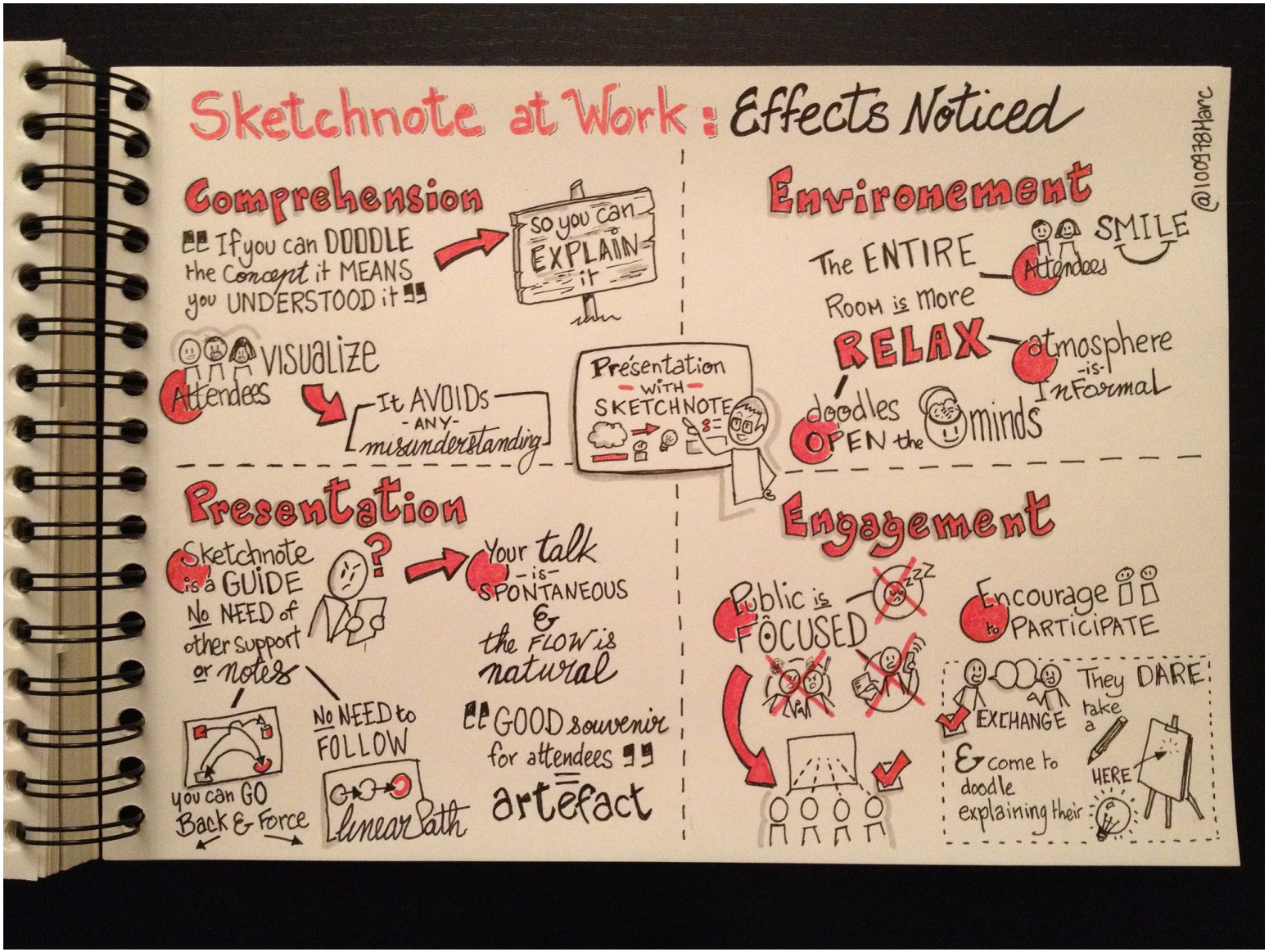
@100978Marc



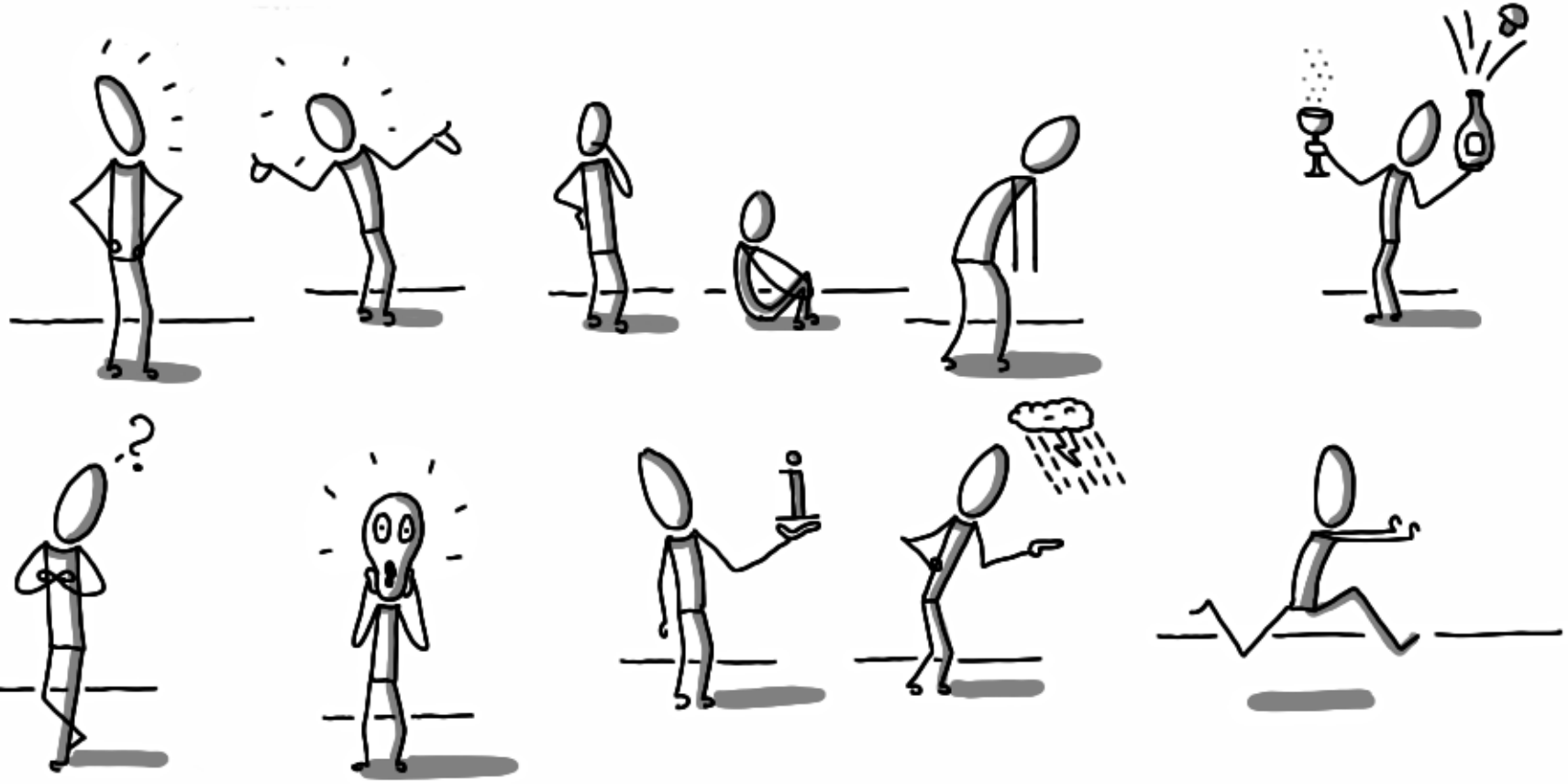
Marc Bourguignon
Business Relationship Manager

PROFICIENCY

Drawing people for sketchnotes

Why? - For visual interest

How? - Stick figures are simple & fast
- make them expressive
- e.g. Bikdolo akademie style



Visual Vocabulary

Icons, Icons, Icons

pencil

pen

world
global
internet

cell phone

sign

phone
(phone call)

angry

book

mail

e-mail

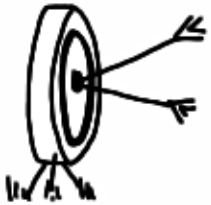
risk

publication

travel

date

gas (cylinder)


goal / target

brain

Swiss army knife
multi-purpose

boom!

calendar
schedule

computer

Holy Grail

scientist
smart guy

wireless
communication

medicine
drugs
drug delivery

bored

clueless
confused
uncertain

FOR ME THE MOST DIFFICULT PART OF SKETCHNOTING IS

FOR ME THE MOST DIFFICULT PART OF SKETCHNOTING IS

LISTENING

WATCHING

PROCESSING

WHILE SIMULTANEOUSLY

SKETCHING & WRITING

FOR ME THE MOST DIFFICULT PART OF SKETCHNOTING IS

LISTENING

WATCHING

PROCESSING

WHILE SIMULTANEOUSLY

SKETCHING & WRITING

MASTERY

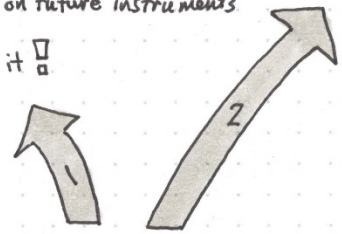
"IN THE ZONE"

LISTEN LIKE A NINJA

SKETCHNOTING & DAILY WORKFLOW

Welcome to NIST

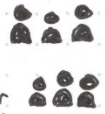
Thank you! for taking the time to come (I know many of you have lots going on like teaching) give us expert advice on future instruments at the NCNR we really appreciate it



Logistics

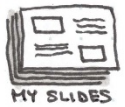
Here's your charge again
1. What do the new capabilities enable?
2. What should we build next?

- You have been assigned to one of nine topical BREAKOUT GROUPS



- Each has a chair responsible for guiding/leading discussions and responsible for making sure the group has a written report within a week of the workshop. You should shoot for ~3 pages. Also the chair is responsible for a 10-minute presentation on Friday afternoon.
- A scribe from the NCNR has been assigned to assist the group in getting what they need.
- Collin Broholm & Rob Briber will write an executive summary.
- All presentations & write-ups sent to Rob Briber

- Your **Task** needs some context setting. This morning you'll hear science talks from Collin, Norm, and Mike. Then you'll hear talks on enabling capabilities from Chuck Mielke, Dan Hussey, and Chuck Majkrzak.
- During this workshop there will be NCNR staff, including myself & Dan Neumann, available to provide further context on the NCNR capabilities. Please feel free to use us to help you as you need it.
- For some initial context on the Expansion and where it brought us to today, I'll cover some of the development highlights.



8 Years Ago in 2006

- We asked the user community for input on the next generation of neutron instruments and enabling capabilities
- Some of you have returned that participated in 2006
- They gave us input that we could use as a direct part of our multi-year cold neutron expansion.

- We listened — and the NCNR has been literally, physically transformed
  - A new cold source
  - A new advanced cold neutron guide system
  - New instruments
  - Polarized beam capabilities

With just 2 more instruments left in development, vSANS and CANDOR, we now find ourselves at a point where we want more input from you.

Your **Charge** is two-fold:
1. What new research opportunities could be addressed by new capabilities in the NCNR Expansion?
2. What are the new measurement capabilities that would open new research opportunities for the U.S.?

Think BROADLY
- New instruments
- Upgraded instruments
- New or better sample env.

This is about enabling the best science through neutron scattering

What do the users need?

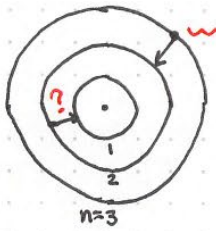
Adventures Inside the Atom
Detecting Neutrons with Far UV Radiation

10.14.2014

Charles Clark

It's hard to imagine doing this work anywhere else other than NIST.

NIST = NCNR + SURF III + CNST



→ λ = 656 nm
Δn = 3→2
Balmer α line

Δn = 2→1 predicted but not observed
λ = 1216 Å
Lyman α line difficult to see due to impurities

Bohr model... still useful here.

CC asked R Vest: what's the mean free path of Lyman α in air?

RV: Not sure but moisture may be a problem.

Lyman α blobs are largest, most massive objects known

←3x10^5 LY→

Absolute Radiometry
A DISMAL SCIENCE

Bill Phillips

?

Don't distract me with your questions!

Clark

Far UV is hard b/c it bridges x-ray to radio measurements

A chance encounter with Tony Leggett steered CC to trying to understand why a slow neutron caused a phase change in SF ^{3}He at mK temps.

Werner's Rule of Twos

2 Å
20 meV
2000 m/s

How do you detect thermal neutrons? They're not charged.

You need the help of GOD

$n + {}^3He \rightarrow p + t + 0.76\,MeV$
$n + {}^6Li \rightarrow \alpha + t + 4.87\,MeV$
$n + {}^{10}B \rightarrow {}^7Li + \alpha +$ (2.8 or 2.3 MeV)

But what happens to the 2 electrons in the $n + {}^3He \rightarrow p + t$ reaction?

H. Arif ⇨ "No one knows."

Neutron detection
A DISMAL SCIENCE

M. Caplan ⇨ "I know a guy. He see to look for lyman-α"

Found it — but not by the mechanism they originally thought

Lyman α neutron detector

Patent # 7,791,045

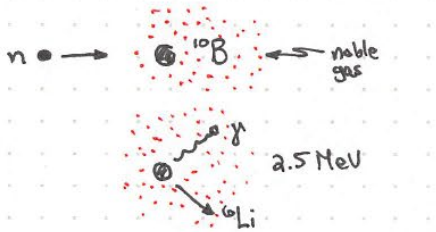
R&D 100 recipient

^{3}He crisis ⇨ explore other gases than ^{3}He

^{10}B

"Reticulated vitreous carbon foam" for possible lattice gas
C. Lavelle (JHU) acquired RVC foam but fab technique is proprietary

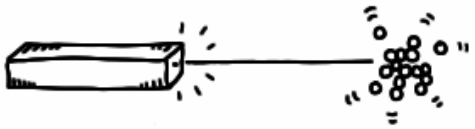
Detection Process



Excites noble gas creating excimer (excited noble gas atom + unexcited)

Excimer decays releasing far UV light

INNOVATION



INDUSTRY'S NATIONAL LAB

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We promote U.S. innovation and industrial competitiveness by advancing measurement science, standards, and technology in ways that enhance economic security and improve our quality of life.

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- Rigorous traceability
- Development and use of standards

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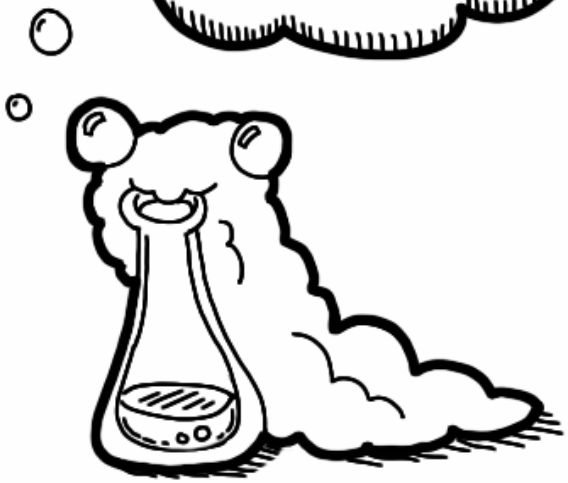


SKETCHNOTE: Rob Dimeo 10.29.2015

SKETCHNOTING SCIENCE

Publications & Talks and other stuff

MY WORKFLOW FOR SKETCHNOTING TECHNICALLY DETAILED SCIENCE TALKS

① PLAN AHEAD

When is the talk?
Schedule prep time

PREP IS CRITICAL

② PREPARATION

Find out as much about the talk beforehand

- Abstract for the talk
- Speaker's published work
- Speaker's website
- Slides on-line from other presentations

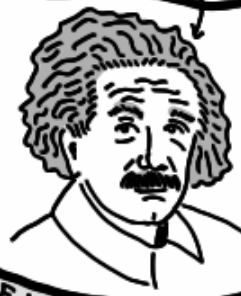
Think of some quick doodles & icons that might come in handy.

Expand vis vocab

Create the title area with speaker's name, affiliation, and date.

Find photo on-line and include a quick sketch of speaker.

TRACING IS OK!



ALBERT EINSTEIN
General Relativity
ETH Zurich
05.02.1912

③ MAKE LIVE SKETCHNOTES

NOW I have enough background so I can listen a lot, write down the big ideas & sketch the major plots/graphs.

Mining & Sorting

④ REFINE THE NOTES AFTER THE TALK

Clarify points with speaker after the talk.

Clean up plots/graphs & sketches after. Check with speaker's pubs if available or if slides are available.

⑤ SHARE SKETCHNOTES WITH COMMUNITY (YOU!) AND THE SPEAKER

↳ Speakers seem to like it (few SN-ers in phys. sci.)

↳ Community helps me improve

IT IS A LOT OF WORK BUT IT'S WORTH IT FOR ME!

@Rob_Dimeo

05.03.2015

TiAu

An Itinerant Antiferromagnet Metal Without Magnetic Constituents

E. Svanidze et.al., Nature Communications
DOI: 10.1038/ncomms 8701
13 July 2015

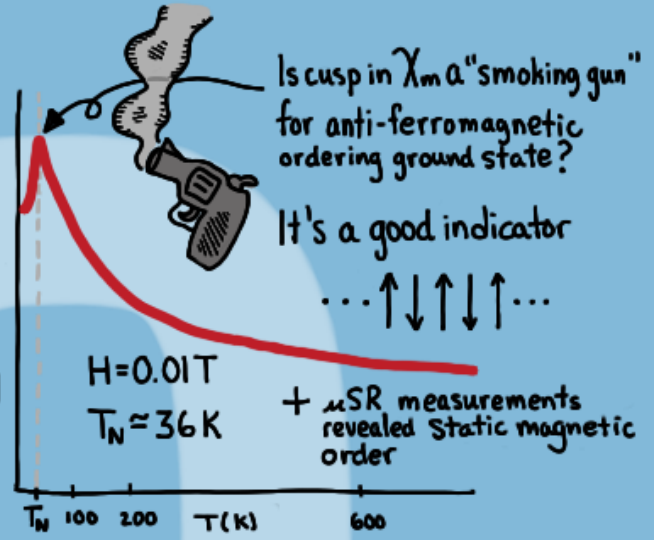
Ti titanium → magnetic

Au gold → magnetic

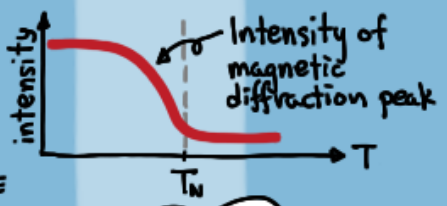
Local Moment Magnetism
magnetic moments localized in real space

Itinerant Magnetism
moments localized in reciprocal space

$\chi_m = \frac{M(T)}{H}$
magnetic susceptibility



+ We can use NEUTRON DIFFRACTION to measure magnetic structure
→ Long Range AFM Order



On their own, neither Ti nor Au are magnetic.

But we can combine them to get TiAu.

Not really how you make TiAu!

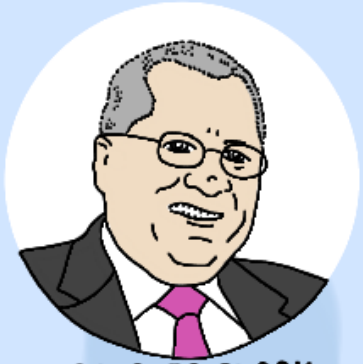
TiAu is MAGNETIC.
Anti-ferromagnetic to be precise.

Why is this important?

1. It's rare – TiAu is only known itinerant AFM without magnetic constituents.
2. It can help scientists develop a better understanding of magnetism in metals, esp. itinerant magnetism vs. local moment magnetism.

SKETCHNOTE: Rob Dimeo 07.25.2015

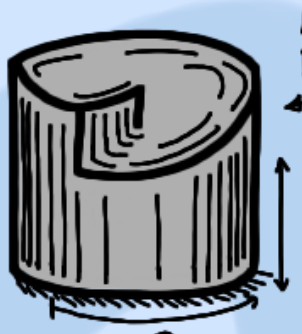
Roman Barankov, Michael Huber, Muhammad Arif, David Cory, Dmitry Pushin



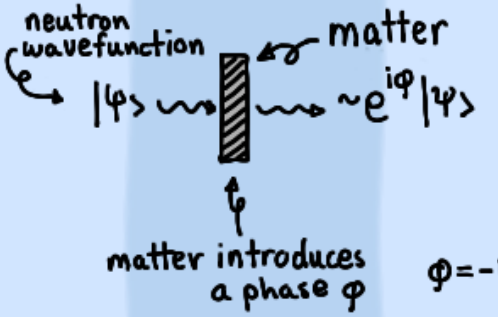
CHARLES CLARK

Neutron Wave Control

07.29.2015



WE KNOW HOW TO CHANGE THE NEUTRON PHASE

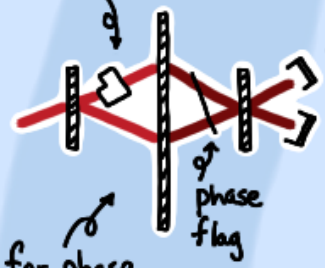


Ok... that's simple enough

$\varphi = -Nb_c\lambda d$

DESIGN THE MATERIAL'S SHAPE to ENCODE OR IMPRINT information in the phase, φ

SPP is inserted in one leg of a Mach-Zender neutron interferometer (NI)

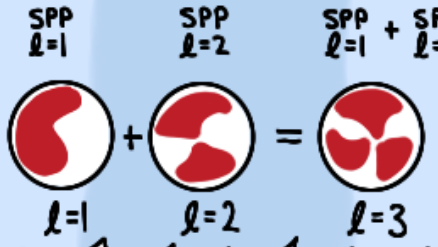


NI for phase analysis

If you could ENGINEER the phase on a neutron....

...then perhaps you could use that in quantum information science or to probe new aspects of materials (e.g. Spin texture, chirality,...)

(I still don't believe God plays dice.)



SUCCESS! ADDITION OF ANGULAR MOMENTA

SKETCHNOTE: Rob Dimeo

QUASI-PERIODIC MATERIALS

A Paradigm Shift in Crystallography

Dan Shechtman
2011 Nobel Laureate - Chemistry
Technion & Iowa State

NIST Colloquium
June 17, 2015

"I did the best research of my life at NBS (NIST)."

Al_6Mn

April 8, 1982
10-fold ???

"There is no such animal!"

DS's lab notebook

You can PINPOINT the DISCOVERY of the ICOSAHEDRAL PHASE & DATE & TIME

Electron diffraction pattern showing icosahedral phase

NOT TWINNING

Paper initially rejected by JAP:
"Wouldn't interest community of physicists."

Accepted: PRL, 53, 2477 (1984)

ORDER, PERIODICITY & SYMMETRY

ROT SYMM

.... 3

.... 4

ORDERED & PERIODIC

1 DIM PERIODICITY

UNTIL 1982

All xtals ordered & periodic

CRYSTALLOGRAPHY A MATURE SCIENCE

You can't have 5-fold symmetry in a crystal.

Eminent Chemist: LINUS PAULING → "DS talking nonsense!" "Quasi science!"

— BUT WAS ACCEPTED —

? WHY DID IT TAKE 70 YEARS TO DISCOVER QCs ?

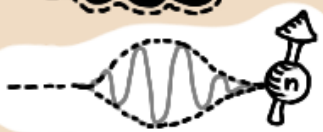
1. TEM for small xtals
2. Professionalism
3. Tenacity
4. Believing in yourself — "arguing with Pauling is not easy!"
5. Resilience

SKETCHNOTES: @Rob_Dimeo

NEUTRONS as QUANTUM OBJECTS

Helmut Rauch
Atominstitut Technische Universität, Austria

Walter Hälg Award Ceremony
09.03.2015



NEUTRON INTERFEROMETER

1 neutron in the NIF at a time!

Self-interference

NIF Applications

Spinor symmetry

$\psi(2\pi) = -\psi(0)$

$\psi(4\pi) = \psi(0)$

Spin Superposition

↑ + ↓ = ↗ not ↑↓

Quantum beat effect w/ resonance flipping magnetic Josephson effect

$\Delta E \sim 10^{-18}$ eV!

He discussed Berry Phase robustness too!

250 kW TRIGA reactor

AUSTRIA

1st Gd neutron detector

POLARIZED NEUTRONS Focus

- SF chopper
- SF selector
- Dynamic Polarization

"Wooden spectrometer"

Bonse-Hart camera

Radiography & tomography

neutron optics resonator

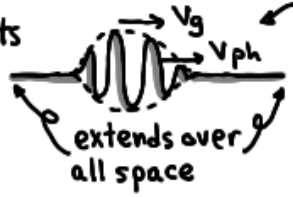
Overlooked Supermirrors & multilayers

21st CENTURY APPLICATIONS

Wavepackets

$\lambda = h/mv$

$i\hbar \frac{\partial \psi}{\partial t} = H\psi$



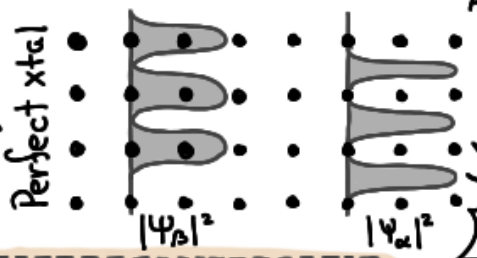
extends over all space

Can measure WP structure!

Neutron Spin Echo Spectrometer

NSE is the BIGGEST quantum device on Earth!

Dynamical Diffraction



Always 2 wavefields in xtal

Wavefnc can be calculated!

Cliff Shull's measurement of Pendellösung oscillations

⇒ Evidence for Dynamical Diffraction

Observation of Schrödinger cat-like states

... + much more! See text by Rauch & Werner 2nd ed.

SKETCHNOTES: @Rob_Dimeo

THE FISHER HOUSE FOUNDATION

Dave Coker, President
(and Employee #1 at FH in 1994)

Zachary Fisher
Founder

"What can I do to honor our vets?"

When Fisher saw a family visiting their loved one in the hospital and saw their suitcases

Where are they going to stay?

We need something like the Ronald McDonald House.

DIGNITY should be afforded to all those who served in the armed forces and their families.

ZF felt he owed a DEBT to those who SERVED

A HOME AWAY FROM HOME

House is a CATALYST for SUPPORT

When you get the call that a loved one has been injured,

YOU WANT

1. best medical care
2. be there with him/her

65 houses to date

250,000 families served

70 houses by January

9 days average length of stay

26,000 families supported in 2015

Transportation is biggest barrier to families being there

FH partnered with airlines

$12/airline ticked

Dave Coker's job highlight: visiting families in the homes

Thanks for saving my life.

DC

NO CONTRIBUTION IS TOO SMALL

2015 NIST CFC KICK-OFF | SKETCHNOTES: @Rob_Dimeo

ON INEQUALITY

A book by Harry G. Frankfurt

1 FUNDAMENTAL CHALLENGE OF OUR TIME

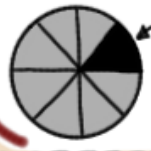
NOT INCOME INEQUALITY ≠

BUT
1. TOO MANY PEOPLE ARE POOR
2. MANY PEOPLE ARE EXCESSIVELY AFFLUENT

Electoral & Regulatory influence
Prone to distortion & abuse

OUR FOCUS SHOULD BE ON
1. REDUCING POVERTY
2. REDUCING EXCESSIVE AFFLUENCE

2 ECONOMIC EGALITARIANISM (EE)



Everyone has the same amount

NOT morally important

(But I compare what I have to what you have)

DOCTRINE OF SUFFICIENCY

Everyone has "enough" ⇨ but what's enough? ⇨ Person's income meets a standard.

Morally compelling

CONTENT
No dissatisfaction from having too little money.

– I'M GOOD!

3 EE has no inherent or underived moral value, but...

RESPECT & IMPARTIALITY ARE MORAL IMPERATIVES

BEING TREATED WITH RESPECT IS NOT THE SAME AS BEING TREATED EQUALLY W.R.T. EE

= EQUALITY – OUTCOMES INDISTINGUISHABLE FOR EVERYONE

RESPECT – OUTCOMES MATCHED TO THE INDIVIDUAL – MORE PERSONAL

IF NO INFO IS AVAILABLE FOR TWO PEOPLE, TREAT EQUALLY

=

In this specific case, RESPECT & EQUALITY coincide

"...moral importance of RESPECT... constrains us to treat people the same when we know nothing that provides us a special reason for treating them differently."

01.31.2016

SKETCHNOTES: Rob Dix

The Physics of Beer Tapping

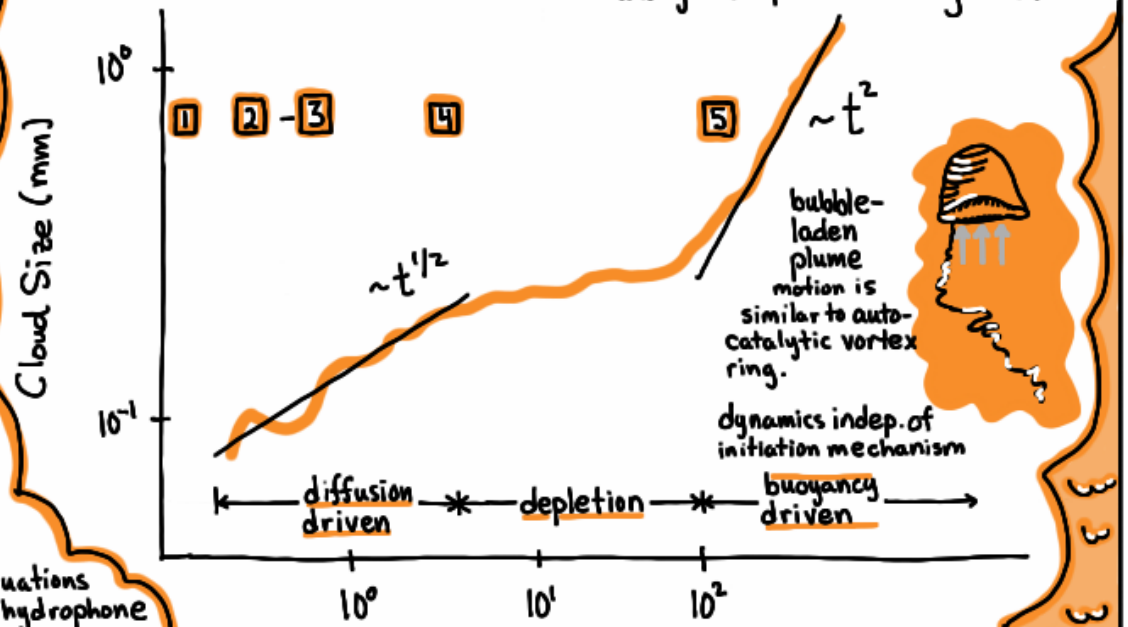
Rodríguez-Rodríguez et. al.,
Phys. Rev. Lett., 113, 214501 (2014)

Beer tapping - prank in which you strike the top of a beer bottle with another bottle resulting in a "foam over"

YET this PHENOMENON LACKED SCIENTIFIC EXPLANATION

Sequence & Description

1. Impact on bottle top causes a compression wave that moves to bottom.
2. Part of wave transferred to beer at bottom. Wave reflected back up as expansion wave.
3a. Bubbles expand near bottom of bottle, while those near the surface shrink at some point.
3b. Bubbles expand as expansion wave passes then collapse into a cloud of bubbles. Breakup likely due to Rayleigh-Taylor instability
4. As bubbles collapse, area of gas-liquid interface increases so clouds grow quickly as carbonic acid diffuses into newly formed cavities. This phase ends when local CO_2 is gone ⇨ Depletion
5. Rapidly growing clusters lead to vortex rings that rise through the beer and help move more CO_2 to the bubbles and yield rapid cloud size growth.



Dynamics of plumes helps to explain the explosive behavior found in lake overturns and volcanic eruptions

Researchers used modern methods to examine the physics behind the process.

← weight - falls & hits bottle top for reproducible impact

OR

Laser pulse can create single bubbles & clouds of bubbles

Pressure fluctuations recorded with a hydrophone

bubble
beer
Laser
High speed camera to record bubbles

SKETCHNOTES: Rob Dimeo 05.21.2015

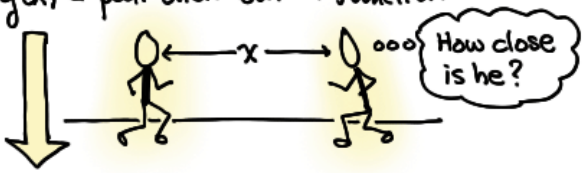
How Do Pedestrians Moving in Crowds Interact with Each Other?

from "Universal Power Law Governing Pedestrian Interactions"

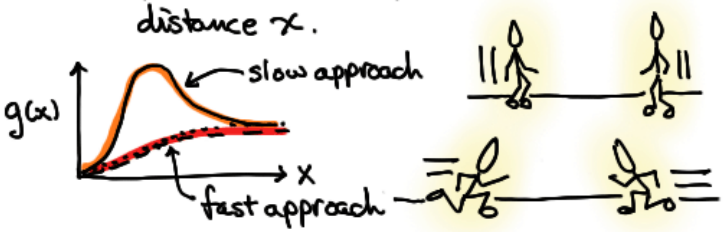
Phys. Rev. Lett. vol. 113, 238701 (2014)

Analysis

$g(x)$ = pair distribution function



$\propto$ probability density that two pedestrians are separated by distance x.



$g(x)$ small ⇨ collision avoidance

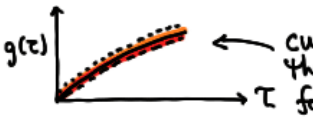
The Approach

= Studied real crowd motion

Used Statistical mechanics methods from condensed matter physics to analyze the motion.

BUT

for collision time, τ, $g(\tau)$ looks like:

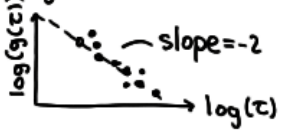


curves are the same for fast and slow!

universal behavior

More detailed analysis...

$g(\tau) \propto e^{-E(\tau)/E_0}$



$E(\tau) = \frac{k}{\tau^2} e^{-\tau/\tau_0}$

$E(\tau)$ = pedestrian interaction energy

E_0 = scene dependent char. energy

∴ Pedestrian interactions are anticipatory – collisions are avoided in observations and model.

@Rob_Dimeo

12.10.2014

How to Make French Press

1. 2 TBSP BEANS (GRIND)

8oz. CUP OF COFFEE

BURR GRIND ON COARSE SETTING.

POUR GRIND INTO FRENCH PRESS POT.

2. BOIL WATER AND LET IT COOL FOR 1 MINUTE. POUR INTO POT.

STIR WITH A PLASTIC UTENSIL TO PREVENT DAMAGING THE GLASS POT.

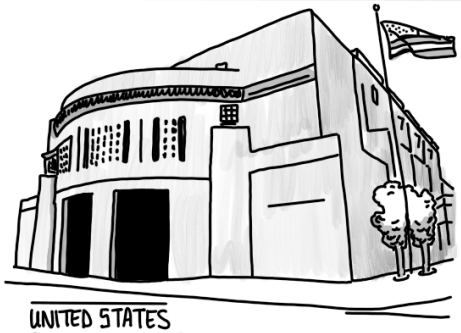
3. STEEP FOR 4 MINUTES.

4. STIR AGAIN

5. PRESS PLUNGER DOWN ALL THE WAY.

SERVE.

@Rob_Dimeo 12.06.2015



UNITED STATES
HOLOCAUST MEMORIAL MUSEUM

March 12, 2016 visit

YOU ARE MY WITNESSES
ISAIAH 43:10

FOUNDATIONS OF A DICTATORSHIP

POWER ASSUMED UNDER GUISE of LAWLESSNESS
CONCEALED TRUE INTENT
ROSE TO POWER AMID POLITICAL & ECONOMIC TURMOIL

CONSERVATIVE POLITICIANS | UNDERESTIMATED HIM

LEFT-WING POLITICIANS | EQUALLY NAIVE

NO ONE TOOK HITLER SERIOUSLY
until it was too late...

Hitler's LEADER PRINCIPLE
ONE PEOPLE - ONE REICH - ONE LEADER
| CENTRALIZED POWER IN ONE MAN

Taught the people to THINK IN RACIST TERMS

1933 BOOK BURNINGS

THE AGE OF HAIRSPLITTING JEWISH INTELLECTUALISM IS DEAD... THE PAST LIES IN FLAMES.
Goebbels – Propaganda Minister

TYRANNY CANNOT DEFEAT THE POWER OF IDEAS
Helen Keller

ANTI-JEWISH POLICIES
JEWISH BUSINESSES SHUTTERED
| END OF EQUAL RIGHTS ≠

JEWISH REFUGEE CRISIS
GO GO
| ÉVIAN CONFERENCE GERMAN & AUSTRIAN JEWS USELESS

BUT FEW HAVENS

TERROR AGAINT THE POLISH
"IT IS DIVINE LAW TO OBEY THE GERMANS"
– Heinrich Himmler

MURDERING THE HANDICAPPED
>70,000 Physically & mentally disabled killed
via OPERATION T4

THE FINAL SOLUTION

FORCED JEWISH EMIGRATION "FAILED"
SOLUTION ⇒ GENOCIDE

DEATH CAMPS

born Dec. 8, 1941 Chełmno, Poland

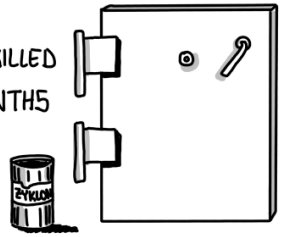
MOBILE KILLING SQUADS
>1.2 M JEWS IN RUSSIA VICTIMS OF THE SQUADS

WHO SHALL LIVE AND WHO SHALL DIE?

>3M PEOPLE KILLED (CONCENTRATION CAMPS)

ARBEIT MACHT FREI
WORK SETS YOU FREE

1M JEWS KILLED IN 6 MONTHS



AUSCHWITZ
GAS CHAMBERS & CREMATORIUM

EXTERMINATION THROUGH WORK

I REMEMBER A WOMAN WHO TRIED TO THROW HER CHILDREN OUT OF THE GAS CHAMBER, JUST AS THE DOOR WAS CLOSING. WEEPING, SHE CALLED OUT: "JUST LET MY PRECIOUS CHILDREN LIVE."
Rudolf Höss

NEVER SHALL I FORGET THESE THINGS, EVEN IF I AM CONDEMNED TO LIVE AS LONG AS GOD HIMSELF.
NEVER. – Elie Weisel

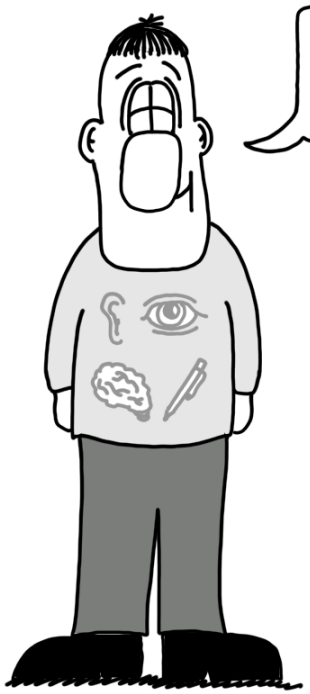
SKETCHNOTES: Rob Dog

NIST SKETCHNOTE COMMUNITY

WHAT : INFORMAL MEETINGS OF THE NIST SKETCHNOTE COMMUNITY

WHEN : EVERY OTHER FRIDAY 12-1 PM STARTING APRIL 29, 2016 (e.g. 4/29, 5/13, 5/27, etc.)

WHERE: BLDG 235, ROOM K-04B



BRING A PEN AND NOTEBOOK – WE WILL BE DRAWING & WRITING!

BRING YOUR LUNCH

SEND EMAIL TO SKETCHNOTES-REQUEST@NIST.GOV WITH SUBJECT "SUBSCRIBE"

STUFF WE WILL DO

SKETCHNOTE SKILL DEVELOPMENT	BUILD VIZ VOCABULARY DOODLE WORD DOODLES LETTERING LISTENING LIVE SKETCHNOTING (SHORT TED TALKS, DOCUMENTS, ...)
LEARN FROM THE MASTERS	REVIEW SKETCHNOTES FROM THE PROS WATCH SKETCHNOTE VIDEOS
SHARE OUR OWN SKETCHNOTES	SHOW PROGRESS ASK FOR FEEDBACK

SKETCHNOTE WORKSHOP

Learn how to make a one-page visual summary from just about any information source.

WHEN: Saturday, April 30, 2016 1PM – 5PM (includes 30 minute break)

WHERE: Building 235, K04-B

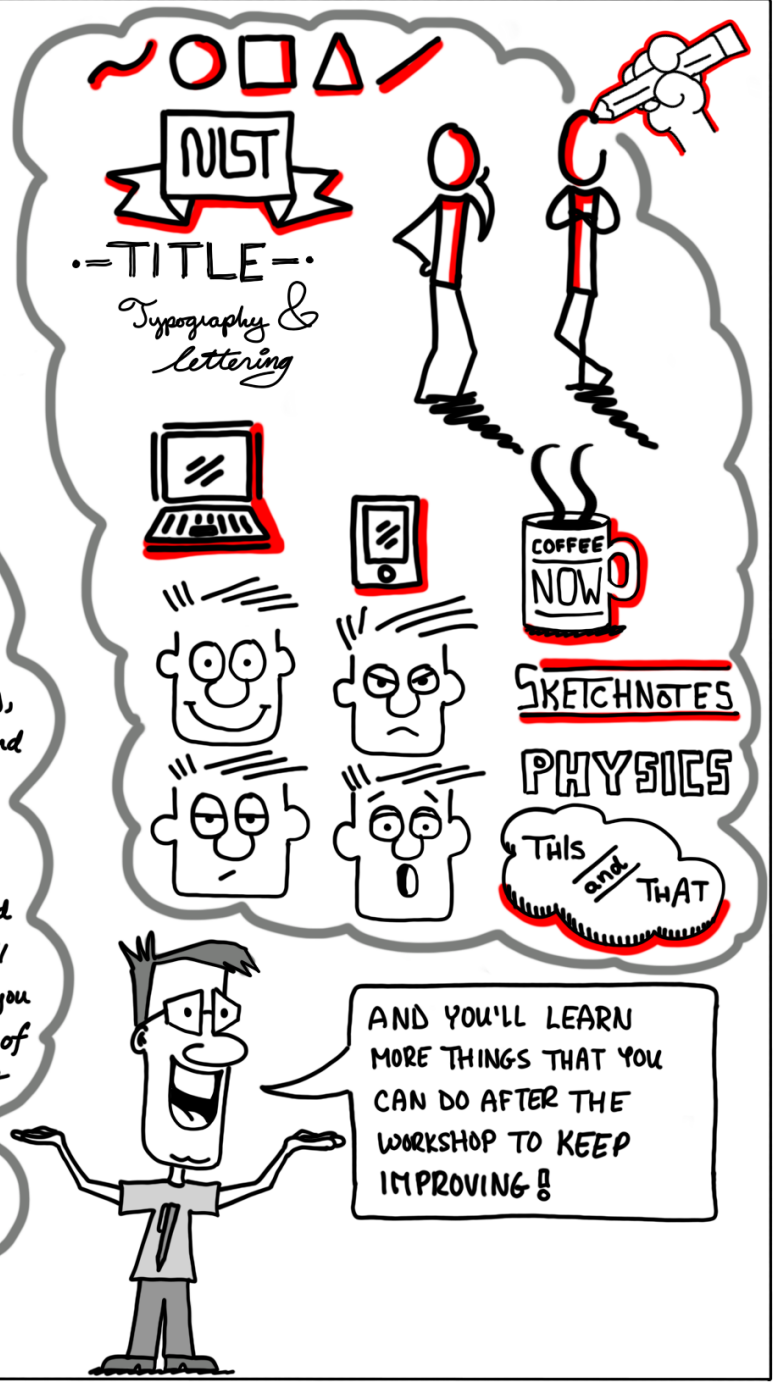
WHO: Highly motivated individuals who want to learn how to create rich, visual notes that they will want to read again as valuable references.

NO ARTISTIC SKILLS REQUIRED

WHAT: In this introductory hands-on workshop, you will learn how to create your own rich, visual notes from live meetings, presentations, articles, books, and other sources of information. Through a series of focused activities you will learn-by-doing. In the first part of the workshop, you will learn – and practice – the fundamental elements of sketchnotes such as simple typography/lettering, containers, arrows, dividers, shapes, simple drawings of people & faces, and how to organize these elements in a sensible visual structure. You will learn the importance of – and start to develop your own – visual vocabulary. Many of the activities you will do will involve very simple drawing exercises – but you need not have any artistic ability beyond being able to scribble a square, circle, triangle, and line. The emphasis will be on simply-drawn elements. You will also learn the two simple things you can do right away that will transform your notes. In the second part of the workshop you will practice making your own sketchnotes from short talks and other content.

WHAT TO BRING: All necessary materials will be provided for you including a notebook & pens but feel free to bring your own preferred writing materials.

MORE INFO: Rob Dimeo
robert.dimeo@nist.gov



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