

# **Experimental Gameplay: Toward a Massively Popular Scientific Practice**

Jane McGonigal, PhD

[www.avantgame.com/aaas.htm](http://www.avantgame.com/aaas.htm)

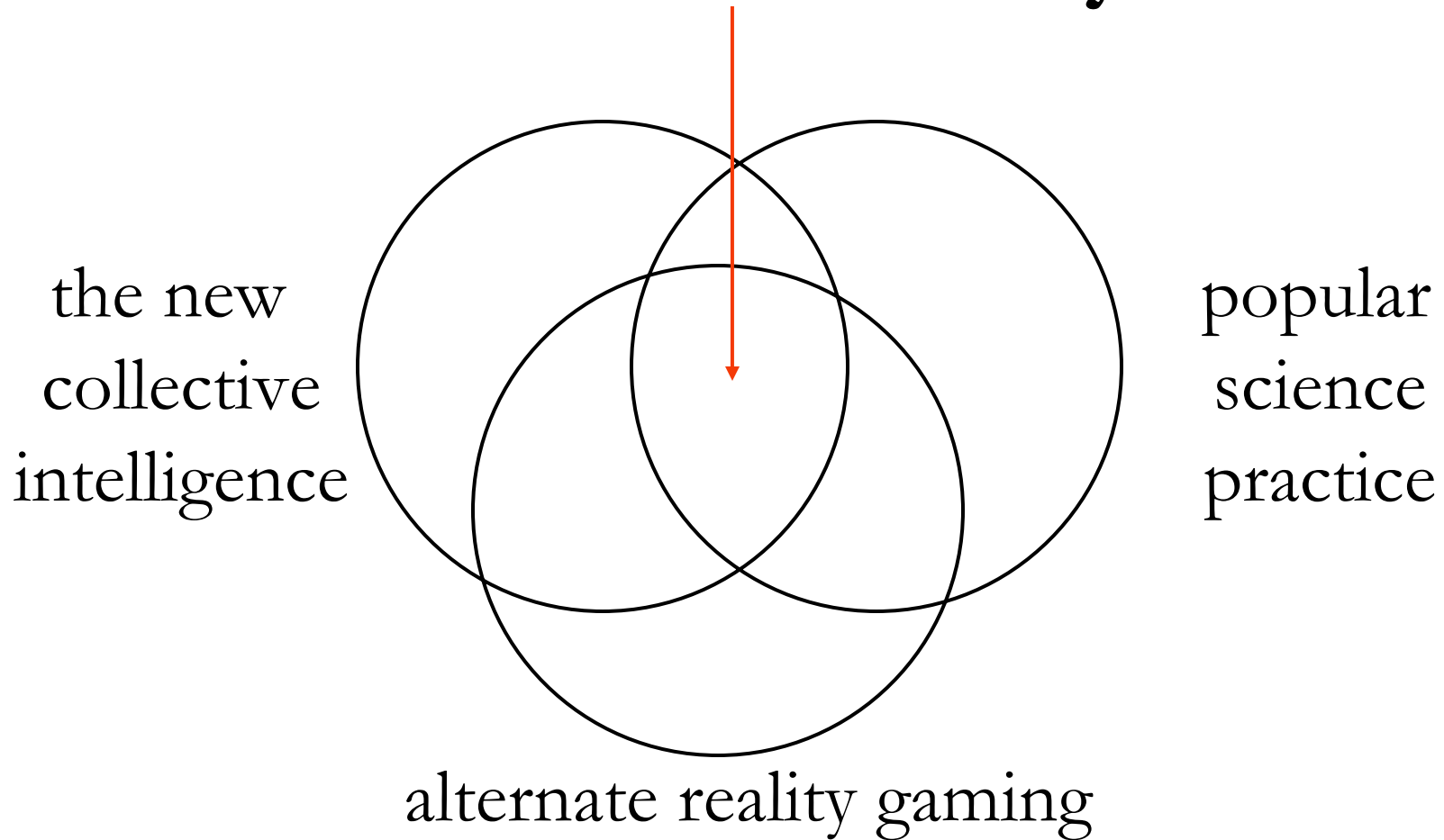
# Experimental Gameplay in the 21<sup>st</sup> Century

Collaborative gameplay that:

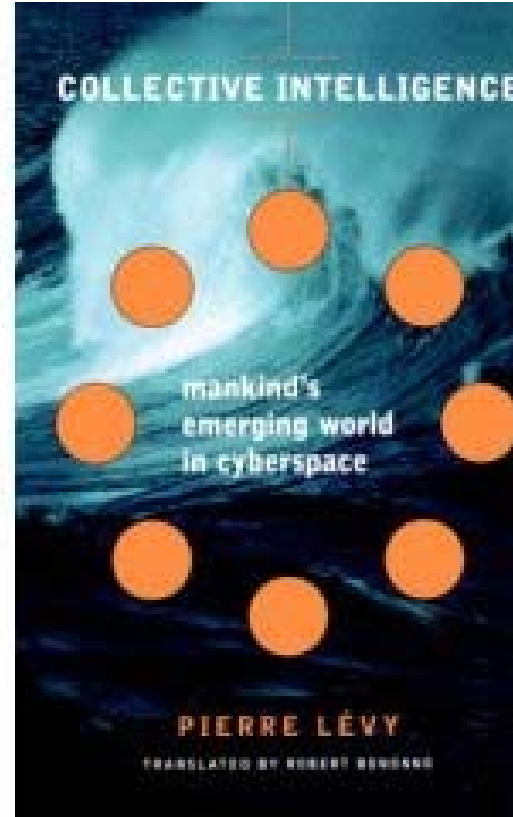
- cultivates traditional scientific habits of mind
- teaches a digital network literacy crucial to 21<sup>st</sup> century science research
- may one day engages massively-multiple citizens in real scientific practice



# Experimental Gameplay in the 21<sup>st</sup> Century



# The New Collective Intelligence



# The New Collective Intelligence



- Massively scaled participation
- New modes of cultural and knowledge production
- “bionic software”  
(supercomputing with and for humans)
- *Cogito ego sum* → *Cogitamus*



# The New Collective Intelligence

For example:

- Wikipedia
- Yahoo! Answers
- Amazon's Mechanical Turk program
- Second Life
- MapHub
- Outside.in
- Google Earth hacks



# A More Popular Science Practice

**Results** from the **Delta Scan** (Institute for the Future & UK's Office of Science & Innovation):

- Increasing platforms for amateur data analysis
- New systems for amateur data collection
- Opportunities to contribute to science are diversifying
- The base of the scientific pyramid is expanding!



# A More Popular Science Practice

For example:

- SETI@home
- Folding@home
- CPUShare
- Flash Mob Supercomputing Project
- World Water Monitoring Day
- Citizen Science, Canada
- Citizen Science at the Royal Society Live Lab





# A More Public Science Practice

**Results** from the **Delta Scan** (Institute for the Future & UK's Office of Science & Innovation):

- Open sourcing science: free and open access to scientific publications
- A “creative commons” for science: increased reading across disciplines will lead to new ideas for experiments, research mash-ups, and the interdisciplinary mixing of science



# A More Public Science Practice

For example:

- Science Commons (a division of Creative Commons)
- Public Library of Science (PLOS)
- WHO Health Internetwork Access to Research Initiative
- Google Scholar
- Global Information Commons for Science Initiative
- BioMed Central, UK and NIH's PubMed Central, US
- citeUlike



# Massively Multi-Citizen Science

## Benefits:

- Increased public support for science
- Better everyday understanding of scientific discoveries and trends
- Exponentially greater scope for data collection, and analytical processing power
- Rapid cycles of interdisciplinary breakthroughs
- Greater youth enthusiasm for careers in science



# Alternate Reality Gaming



“...an obsession-inspiring genre that blends real-life treasure hunting, interactive storytelling, video games and online community...”



# Alternate Reality Gaming

For example:

- The Beast (Microsoft, 2001)
- Metacortechs (grassroots, 2003)
- I Love Bees (42 Entertainment, 2004)
- Art of the Heist (GMD Studios, 2005)
- Lonelygirl 15 (Beckett, Flinders, Goodfried, 2006)



# Alternate Reality Gaming

“... a collective intelligence that is unparalleled in entertainment history.”



# Alternate Reality Gaming

“We would tell a story that was not bound by communication platform: it would come at you over the web, by email, via fax and phone and billboard and TV and newspaper, SMS and skywriting and smoke signals too if we could figure out how.”

– Sean Stewart, co-inventor of the alternate reality gaming genre



# Alternate Reality Gaming

“The story would be fundamentally interactive, made of little bits that players, like detectives or archaeologists, would discover and fit together. We would use political pamphlets, business brochures, answering phone messages, surveillance camera video, stolen diary pages...”





# Alternate Reality Gaming

“...in short, instead of telling a story, we would present the evidence of that story, and let the players tell it to themselves.”



# Alternate Reality Gaming

“We would create puzzles and challenges that no single person could solve on their own.”

- Elan Lee, co-inventor of the alternate reality gaming genre



# Alternate Reality Gaming

“...and we found to our delight it was working. The audience was forming teams, sharing ideas, writing applications, posting theories, arranging group meetings, programming distributed-client password crackers, creating art.”



# Alternate Reality Gaming

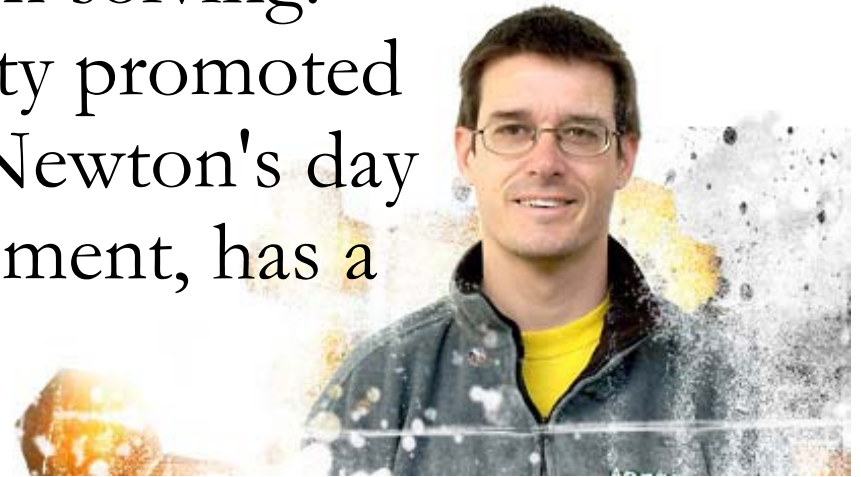
## Core traits

- Not virtual reality... real virtuality
- Massively distributed
- Collaborative meaning-making
- Puzzles, problems, and missions designed to engage diverse skills, interests, and knowledge bases in a massively social knowledge construction



# Alternate Reality Gaming

“By the way, I do NOT assert that [alternate reality gaming] is the first, or greatest, example of massively multi-player collaborative investigation and problem solving. Science, as a social activity promoted by the Royal Society of Newton's day and persisting to this moment, has a long head start...”



# Alternate Reality Gaming

**“We just accidentally re-invented Science as pop culture entertainment.”**

– Sean Stewart, co-inventor of the alternate reality gaming genre



# Case Study: *I Love Bees*

- a 20-week game played in summer/fall 2004
- Created by 42 Entertainment for Microsoft Game Studios
- I was the lead designer in charge of community
  - a playing “public” of over 1 million
  - 600,000 semi-active players
  - a core research group of 4500 players





They  
they  
they make  
Couldn't  
something  
be

HALT - MODULE CORE HEMORRHAGE

Control has been yielded to the  
SYSTEM PERIL DISTRIBUTED REFLEX.

This medium is classified, and has a  
STRONG INTRUSIVE INCLINATION.

PHASE 1 COMPLETE: Network throttling has eroded.

PHASE 2 COMPLETE: This medium has metastasized.

COUNTDOWN TO WIDE AWAKE AND PHYSICAL:

**31:11:42:17:329**

Make your decisions accordingly.

### FAQ

**Q: What happened to this site?**

**A: No idea. Help me out [here](#).**



I Love Bees - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites

Address <http://lovebees.blogspot.com/> Go Links

Google old candy halloween beat Search Web PageRank 4344 blocked AutoFill Options 12 year c Dictionary.com

Blogger™ SEARCH BlogThis! GET YOUR OWN BLOG NEXT BLOG»

# I LOVE BEES

ONE MORNING, AS GREGOR SAMSA WAS WAKING UP FROM ANXIOUS DREAMS, HE DISCOVERED THAT IN BED HE HAD BEEN CHANGED INTO A MONSTROUS VERMINOUS BUG.

TUESDAY, NOVEMBER 02, 2004

## Communications Log


UPDATE: OMG! I posted the wrong time and date. Can you believe it? I'm so excited about the training mission, I spaced. The communications logs will be available at the 27 cache locations below starting at **18:00 Pacific Time on November 4th!** Don't forget the relay code to pick up your log on DVD: "The Operator left something for me." Good luck!

\*

I found a last message from Melissa.

*I realize that some of my truest allies won't be able to come to any of the four training events scheduled for November 4th, where I will also be giving out a communications log of my time here in DVD format. I'm sorry I can't do more training events, but*

ABOUT ME



**DANA**  
SAN FRANCISCO,  
CALIFORNIA, UNITED  
STATES

[VIEW MY COMPLETE PROFILE](#)

Is a phone ringing near you?  
[Current live axons.](#)

**ALLIES**  
[beekeepers forum](#)  
[beekeepers blog](#)  
[beekeepers chat](#)  
[fireflies guide](#)

**TOOLS**  
[timeline and transcripts](#)  
[payphone locator](#)

Done Local intranet

start I... L... I... M... D... a... m... 4... A... s... M... EN Desktop 10:20 PM

the Apocalypse  
It served its


AXONS GO HOT:  
**0-808-0-12:0-34:0-24:00-584**





*Margaret's Honey*  
napa valley, ca

home	about me	the hives	honey	fun stuff!
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<a href="#">Goodies</a>	38.891883 -077.026117 06:07 PDT	41.511567 -081.607317 06:11 PDT
<a href="#">Amazing facts!</a>	42.970906 -077.228967 06:15 PDT	41.652214 -070.289091 06:19 PDT
<a href="#">Hive-Ku</a>	35.247483 -080.805150 06:23 PDT	40.451597 -079.932884 06:27 PDT
<a href="#">The Fable of the Bee</a>	31.217259 -085.360847 06:31 PDT	33.794257 -084.387394 06:35 PDT
<a href="#">The Myth of Comatas</a>	38.885250 -077.028167 06:39 PDT	39.404469 -077.428227 06:43 PDT
<a href="#">Bee-licious Chocolate Chip Cookies</a>	30.792165 -085.376517 06:47 PDT	41.667164 -070.291601 06:51 PDT
<a href="#">Bee Sting Cake</a>	38.799738 -081.348157 06:55 PDT	41.153867 -081.356250 06:59 PDT
<a href="#">Saffron Honey Ice Cream</a>	41.889273 -087.626523 07:03 PDT	36.859230 -075.979429 07:07 PDT
<a href="#">Honey Butter</a>	38.561793 -090.369923 07:11 PDT	30.270063 -087.688176 07:15 PDT
<a href="#">Honey Roasted Carrots</a>	41.360234 -072.870524 07:19 PDT	35.228683 -080.840817 07:23 PDT
<a href="#">Honey Cough Medicine</a>	41.652214 -070.289091 07:27 PDT	30.670746 -088.101535 07:31 PDT
<a href="#">Green Goddess Facial</a>	43.676680 -092.974617	38.706907 -093.224657
<a href="#">Contact me!</a>		

the crash. Looking back on the logs of r  
delicious it is clear I went completely metempsychotic.  
configured to travel light, I have stripped down to the  
entials. To the  
In the summer, a single l  
1 queen  
250 drones  
20,000 female foragers  
40,000 female house-be  
5,000 to 7,000 eggs  
7,000 to 11,000 larvae  
16,000 to 24,000 larva  
\*\*\*  
The average worker bee  
\*\*\*  
Bees are fully grown wh  
\*\*\*  
For centuries, bees have  
honeybee *Apis Dorsata*  
I saw it once, before the  
Spider appears not to h



ARG: The Haunted Apiary (Let Op!)		Topics	Posts	Last Post
	<p><b>The Haunted Apiary (Let Op!): Axon Coordination</b>            This is a temporary moderated forum in which to post your reports from the field at the Axon Coordinate locations, and to discuss whatever the heck ends up happening. Please keep threads strictly on topic as noted. Only moderators can post new threads.</p> <p>: Files :</p> <p><b>Moderators:</b> Aveena, fireball, sapagoo, catherwood, krystyn, LouMac, celina63, aliendial, dnbmathguy, Varin, AnthraX101, BriEnigma, Giskard, rowan72</p>	73	11425	Wed Nov 03, 2004 12:12 pm kazuma →
	<p><b>The Haunted Apiary (Let Op!): General/Updates (aka System Peril Distributed Reflex or ilovebees) - Now Playing</b>            What do the letters in the honey mean? What's up with Dana's aunt's website? What is the connection to Halo 2 for Xbox? Why <b>isn't</b> Dana turning into a bee?</p> <p>: Files :</p> <p><b>Moderators:</b> Aveena, fireball, sapagoo, catherwood, krystyn, LouMac, celina63, aliendial, dnbmathguy, Varin, AnthraX101, BriEnigma, Giskard, rowan72</p>	1336	21749	Wed Nov 03, 2004 12:09 pm Phaedra →
	<p><b>The Haunted Apiary (Let Op!): Quick Reference</b>            Catalog information about sites, characters, and events here. This forum is for reference, not discussion.</p> <p>: Trailhead :: QuickStart :: QuickLinks :: Announce (RSS) (email) :: Wiki (Snapshot) :: Files :: Chat in #beekeepers :</p> <p><b>Moderators:</b> Aveena, fireball, sapagoo, catherwood, krystyn, LouMac, celina63, aliendial, dnbmathguy, Varin, AnthraX101, BriEnigma, Giskard, rowan72</p>	36	315	Wed Nov 03, 2004 11:51 am thebruce →
	<p><b>The Haunted Apiary (Let Op!): Interaction</b>            List interaction you've had with game characters, locations, and events here, including email, telephone and in-person contact.</p> <p>: Files :</p> <p><b>Moderators:</b> Aveena, fireball, sapagoo, catherwood, krystyn, LouMac, celina63, aliendial, dnbmathguy, Varin, AnthraX101, BriEnigma, Giskard, rowan72</p>	149	2632	Wed Nov 03, 2004 11:16 am daboking →
	<p><b>The Haunted Apiary (Let Op!): Puzzles</b>            Catalog puzzles and their solutions here.</p> <p>: Files :</p> <p><b>Moderators:</b> Aveena, fireball, sapagoo, catherwood, krystyn, LouMac, celina63, aliendial, dnbmathguy, Varin, AnthraX101, BriEnigma, Giskard, rowan72</p>	230	9138	Wed Nov 03, 2004 12:01 pm LordSaryon →
	<p><b>The Haunted Apiary (Let Op!): Questions/Meta</b>            New to the game or have a question to which you cannot find the answer? Ask here and we'll do our best to help you out. This is also the place for meta discussions not directly related to gameplay.</p>			

X 36.11582	-115.172868	Paradise NV	Nevada	Las Vegas	<a href="#">map</a> <a href="#">rand</a> <a href="#">acme</a>
X 39.682651	-75.754051	Newark DE	Delaware	Newark	<a href="#">map</a> <a href="#">rand</a> <a href="#">acme</a>
X 35.228683	-80.840817	Charlotte NC	North Carolina	Charlotte	<a href="#">map</a> <a href="#">rand</a> <a href="#">acme</a>
X 42.439348	-76.51062	Ithaca NY	New York	Ithaca	<a href="#">map</a> <a href="#">rand</a> <a href="#">acme</a>
X 41.305402	-72.924261	New Haven CT	Connecticut	New Haven	<a href="#">map</a> <a href="#">rand</a> <a href="#">acme</a>
X 39.950079	-75.14569	Philadelphia PA	Pennsylvania	Philadelphia	<a href="#">map</a> <a href="#">rand</a> <a href="#">acme</a>
X 38.886117	-77.027917	Washington DC	D.C.	Washington	<a href="#">map</a> <a href="#">rand</a> <a href="#">acme</a>
X 35.074196	-89.91932	Oakville TN	Tennessee	Memphis	<a href="#">map</a> <a href="#">rand</a> <a href="#">acme</a>
X 35.228864	-80.840941	Charlotte NC	North Carolina	Charlotte	<a href="#">map</a> <a href="#">rand</a> <a href="#">acme</a>
X 40.72614	-73.42427	South Farmingdale NY	New York	East Farmingdale	<a href="#">map</a> <a href="#">rand</a> <a href="#">acme</a>
X 44.465961	-73.18061	South Burlington VT	Vermont	South Burlington	<a href="#">map</a> <a href="#">rand</a> <a href="#">acme</a>
X 41.76432	-72.68196	Hartford CT	Connecticut	Hartford	<a href="#">map</a> <a href="#">rand</a> <a href="#">acme</a>
X 34.857817	-82.671616	Pickens SC	South Carolina	3 km NE of Aial	<a href="#">map</a> <a href="#">rand</a> <a href="#">acme</a>
X 40.75201	-73.981868	Manhattan NY	New York	New York	<a href="#">map</a> <a href="#">rand</a> <a href="#">acme</a>
X 40.84873	-73.16681	Nesconset NY	New York	Smithtown	<a href="#">map</a> <a href="#">rand</a> <a href="#">acme</a>
X 45.198595	-93.549977	Rogers MN	Minnesota	1 km N of Rogers	<a href="#">map</a> <a href="#">rand</a> <a href="#">acme</a>
X 37.505053	-77.628617	Midlothian VA	Virginia	Bon Air	<a href="#">map</a> <a href="#">rand</a> <a href="#">acme</a>
X 36.000883	-78.94045	Durham NC	North Carolina	Durham	<a href="#">map</a> <a href="#">rand</a> <a href="#">acme</a>
X 38.890469	-77.026	Washington DC	D.C.	Washington	<a href="#">map</a> <a href="#">rand</a> <a href="#">acme</a>
X 36.85923	-75.979429	Virginia Beach VA	Virginia	Virginia Beach	<a href="#">map</a> <a href="#">rand</a> <a href="#">acme</a>
X 44.34641	-72.7453	Waterbury VT	Vermont	Waterbury	<a href="#">map</a> <a href="#">rand</a> <a href="#">acme</a>
X 40.34987	-74.66295	Princeton NJ	New Jersey	Princeton	<a href="#">map</a> <a href="#">rand</a> <a href="#">acme</a>
X 43.21259	-71.51408	Concord NH	New Hampshire	Concord	<a href="#">map</a> <a href="#">rand</a> <a href="#">acme</a>
X 39.951054	-75.153517	Philadelphia PA	Pennsylvania	Philadelphia	<a href="#">map</a> <a href="#">rand</a> <a href="#">acme</a>
X 40.435801	-79.957633	Pittsburgh PA	Pennsylvania	Pittsburgh	<a href="#">map</a> <a href="#">rand</a> <a href="#">acme</a>
X 42.346201	-71.864829	Holden MA	Massachusetts	Holden	<a href="#">map</a> <a href="#">rand</a> <a href="#">acme</a>
X 41.306549	-72.926978	New Haven Harbor CT	Connecticut	New Haven	<a href="#">map</a> <a href="#">rand</a> <a href="#">acme</a>
X 40.34853	-74.66343	Princeton NJ	New Jersey	Princeton	<a href="#">map</a> <a href="#">rand</a> <a href="#">acme</a>

recipe8 axons

recipe8 axons

Sunday, October 31, 2004



Axons

Crew #1  
A, O, N

Crew #2  
P, B, L

Crew #3  
P, I, K

Crew #4  
M, E

Crew #5  
C, J

Crew #6  
D, G

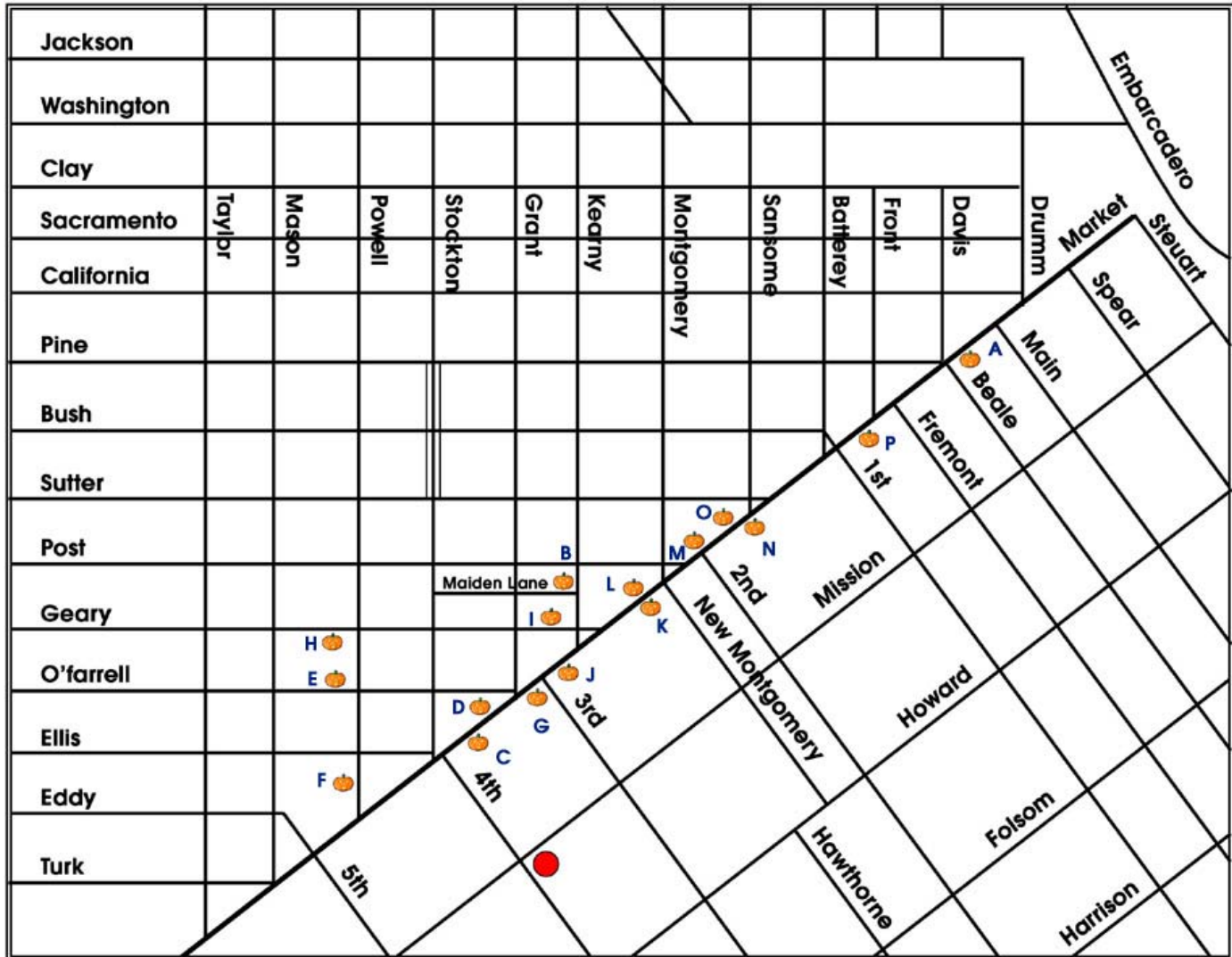
Crew #7  
F, L

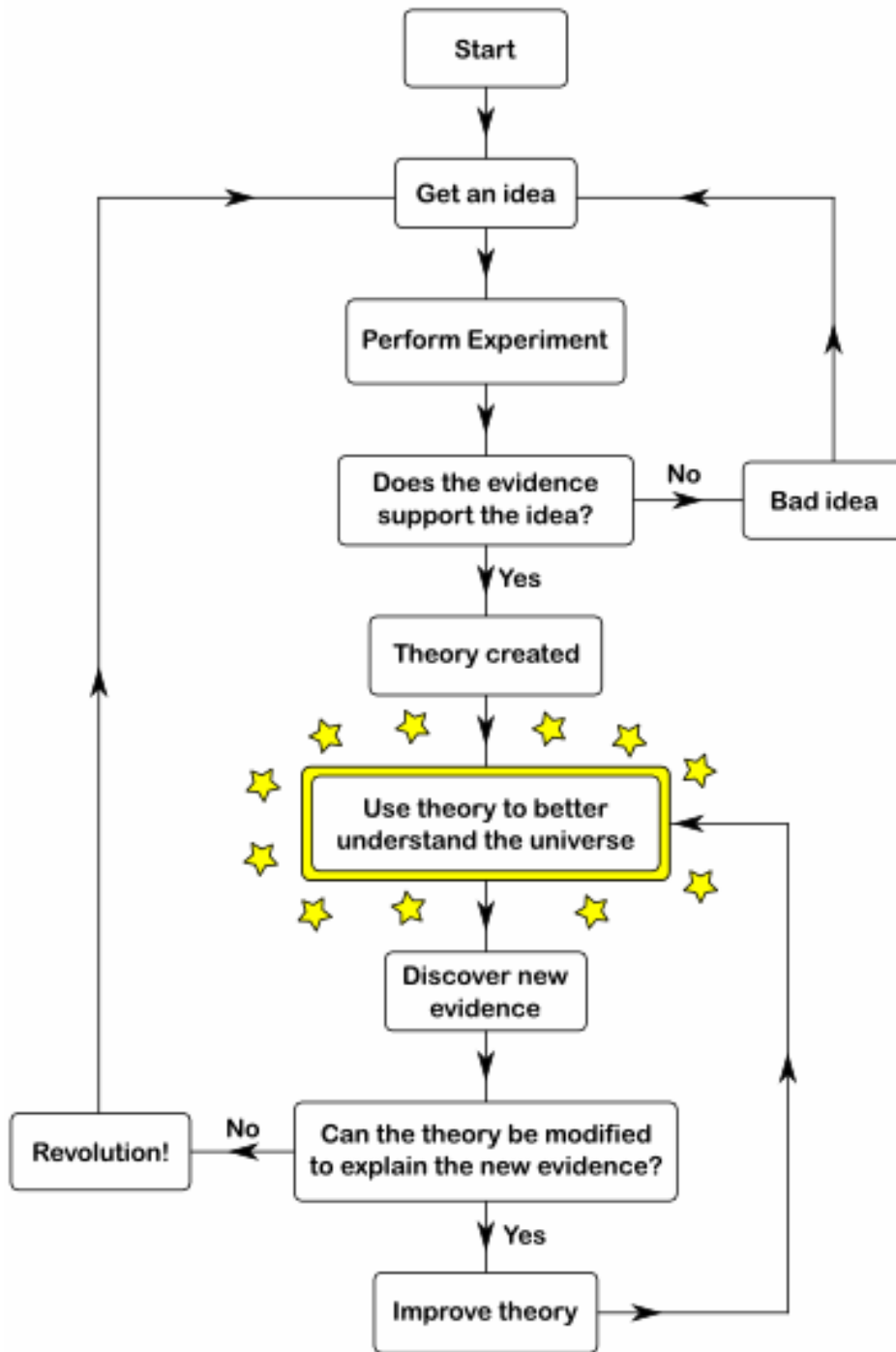
Crew #8  
H, K



Combat Training  
Exercise

Thursday, November 4, 2004





**“How Science Works”**  
Wellington Grey  
[www.wellingtongrey.net](http://www.wellingtongrey.net)

# Massively Participatory Puzzle Design

- **massively distributed content**  
*complexity of real-world data*
- **meaningful ambiguity**  
*“wicked problems”, defined collectively through play*
- **real-time responsiveness**  
*“puppet masters” redefine successful contribution*



# Experimental Gameplay in the 21<sup>st</sup> C.

Collaborative gameplay that:

- cultivates traditional scientific habits of mind:
    - AAAS *Benchmarks for Scientific Literacy* (1993)
    - “...Online Play” Steinkuehler & Chmiel (2006)
  - teaches a digital network literacy crucial to 21<sup>st</sup> century science research:
    - MacArthur Foundation Spotlight on Digital Media & Learning <http://spotlight.macfound.org/>
    - Jenkins, Salen, boyd, Ito, McGonigal, e.g.
- 





# Experimental Gameplay in the 21<sup>st</sup> Century

Collaborative gameplay that:

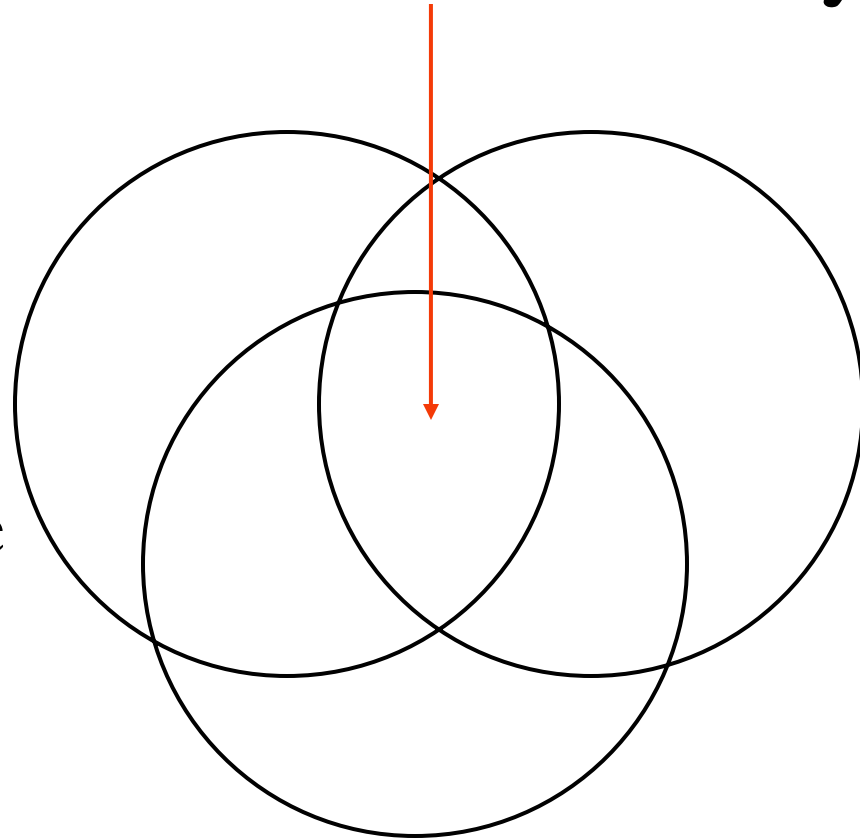
- may one day engages massively-multiple citizens in real scientific practice...?
- Goal: **By 2032, a game designer or developer has been nominated for a Nobel Peace Prize.**



# Experimental Gameplay in the 21<sup>st</sup> Century

the new  
collective  
intelligence

*the tool kit*



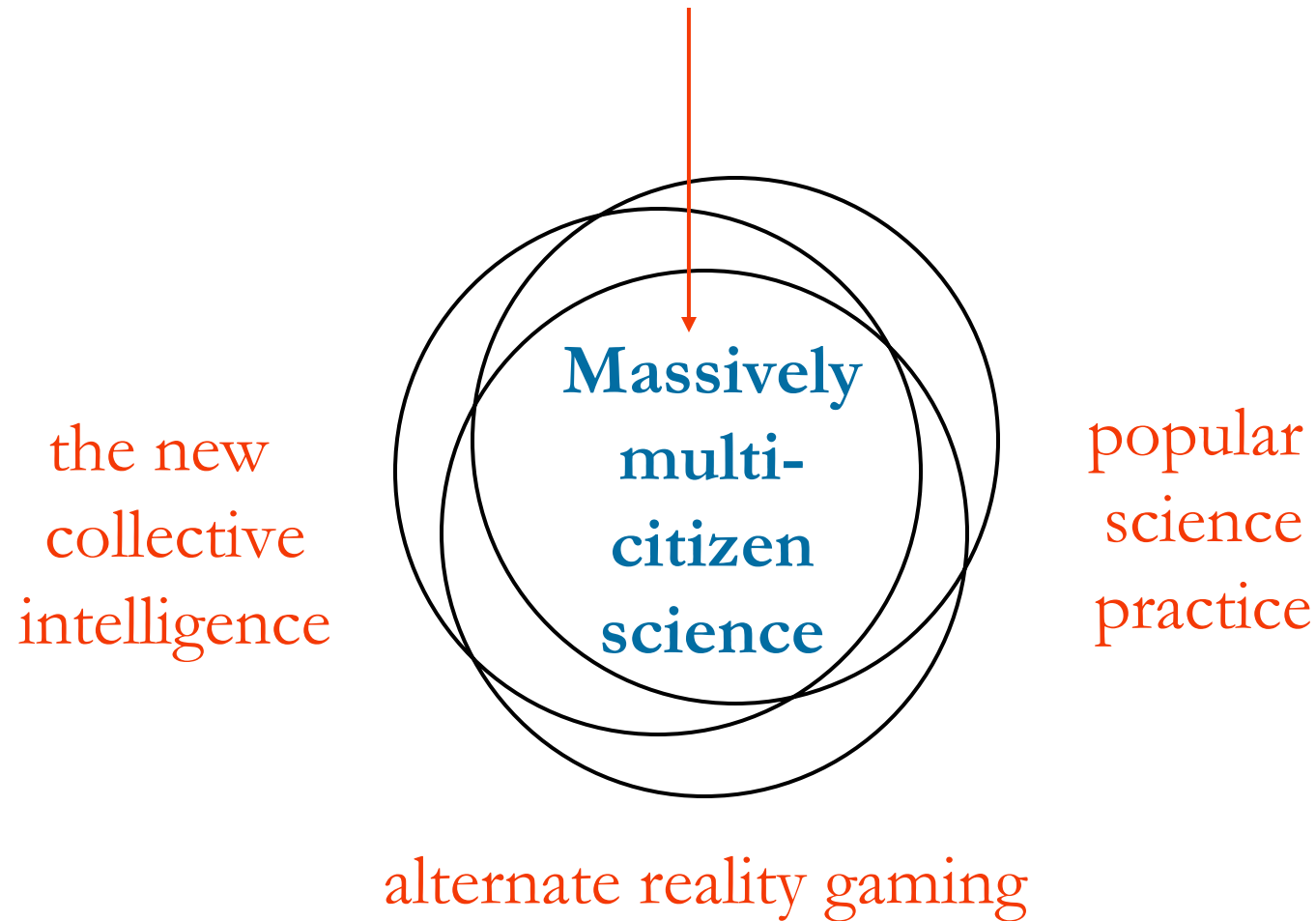
popular  
science  
practice

*the culture*

alternate reality gaming *the participation framework*



# ...as these three trends converge...



# Play with me – [jane@avantgame.com](mailto:jane@avantgame.com)

