

**“WHAT CAN I LEARN FROM THIS?”
OR: SOME THINGS I WISH I’D LEARNED SOONER**

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She generally gave herself very good advice (though she very seldom followed it)

—**Alice’s Adventures in Wonderland**, by Lewis Carroll

On January 4, 2017, I gave an AMS-MAA Invited Address at the Joint Mathematics Meetings (JMM) in Atlanta, Georgia entitled “Through the cryptographer’s looking-glass, and what Alice found there”. In the talk, I took the audience on a quest to find cryptographically useful multilinear maps [1], and I interwove some of what I learned both professionally and personally in my adventures as a mathematician and cryptographer. At the end of the talk I circled back to some of the ideas I had raised, consisting of advice I wish I had learned earlier in my career that I thought would be useful for the audience. I hoped that the audience might find inspiration for New Year’s resolutions or “aspirations” from some of those thoughts.

This article is an attempt to write up some of that advice. While it consists of ideas that we all know on some level, and that many others have said earlier and better, we don’t necessarily put these ideas into practice. Sometimes it helps to remind ourselves of them or make them more explicit; this is an invitation for you to think about them more deeply.

I’m apprehensive about giving advice, since one doesn’t know how the recipient will react. I’m not claiming to have achieved any of the goals put forth here. I’ve made many mistakes over the years, and I am hoping that what I learned from those mistakes can help others to not make quite as many. If you choose to read this article, I hope that you will read the advice with an open mind (you don’t have to follow it!) and ask yourself “What can I learn from this?”

1. BE CURIOUS, AND OPEN TO OPPORTUNITIES



‘Curiouser and curiouser!’ cried Alice

1.1. ***Carpe diem.*** Being curious and open to opportunities is particularly important in mathematics.

Doing good mathematics involves seizing opportunities. You never know where the next idea will come from. I believe that we improve our chances of doing good work when we are open-minded and curious.

Teaching and learning involve curiosity. In trying to help a student, it helps to be curious about what the student is thinking. At the same time, a curious student who seizes opportunities might learn more, and succeed more easily.

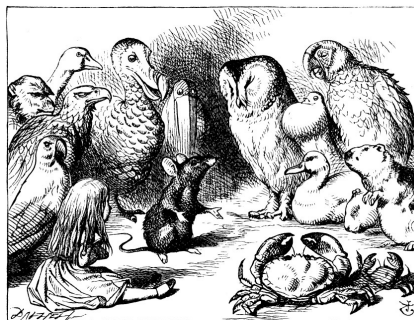
One thing that was striking when I moved to Orange County, California (“the OC”), was that people seemed to lack curiosity. They were eager to talk, but not so interested in listening, or in asking questions. It’s possible this is more than just an OC thing, and is more widespread. Perhaps the world would be a better place if people listened more, asked questions, and learned from what others have to offer, especially people different from themselves (including those coming from different fields of mathematics, different backgrounds and experiences, different demographics, and different interests; talking with and going to lectures by artists, writers, and historians can be eye-opening!).

1.2. Ask yourself: “What can I learn from this?” For every book you read, or movie you see, or social media post someone shares with you, even if you don’t like it, ask yourself “What can I learn from this?”

Ask “How can I use this to make the world a better place?” (Or how can you use it to make the mathematical community better, or to improve yourself.)

These are also useful questions to ask when something bad happens. When a journal rejects your paper, or you don’t do well on an exam, or your students submit negative evaluations of your teaching, ask yourself what you can learn from it that will help you in the future.

2. DEEP LISTENING



2.1. Listen deeply to others, and to different points of view. This is useful with co-authors, colleagues, friends, adversaries, and potential allies, and it’s a way to turn adversaries into allies.

What does it mean to listen deeply?

- Listen without interrupting.
- Listen without planning what you’ll say.
- Just listen, and pay attention.

Think about the committees you’re on, and ask yourself: “Would we be more effective if we made listening respectfully a higher priority?” If you’re chairing a committee, that’s something that you can facilitate and encourage.

I used to think I was a good listener, but then someone told me that I don’t do it right. I’m a problem solver, so while I listened, I was trying to solve whatever problem I was hearing. But sometimes one can do more good by just listening deeply. And listening is an excellent way to learn something new that might help you solve a mathematics problem!

2.2. Listen to advice with an open mind.



You don’t need to follow advice that you’re given, but it’s good to listen to it with an open mind. Don’t assume it’s criticism. Ask yourself “What can I learn from this?” For every encounter, find something useful to take away.

3. COMMUNICATION IS KEY



3.1. Communication is everywhere. A lot of what mathematicians do is communication. Mathematics publications are a form of communication. Teaching is communication. Interactions on committees are communication.

Every community can teach us something that we can use to do things better. So it’s useful to communicate with people from other communities (other areas of interest, other countries, etc.), and to learn from them.

3.2. Keep communication channels open.



For me, keeping communication channels open is extremely important. Cutting off communication can close doors. Some doors, once closed, are hard to open; permanently closing doors is rarely in one's best interest. Even if you're not getting along with someone now, it might be important to stay on good terms with them; you never know when you might need to have them on your side in the future. While things might have to get worse before they get better, as long as communication channels are open, there's hope.

I'm struck by how many misunderstandings are due to failures to communicate, or poor communication. Many misunderstandings come from people incorrectly reading other people's minds, and attributing bad motives to the other person. And one is more likely to attribute bad motives to people one views as "the other", so members of minority groups and underrepresented groups can bear the brunt of this. Misunderstandings fester, that could easily have been resolved through better communication.

3.3. Learn constructive ways to communicate. Learn to communicate:

- without reading other people's minds (if you want to know what they're thinking or feeling, ask them),
- without assuming others are correctly reading your mind.

In particular, don't assume that others can read your mind and figure out why you're angry with them.

Even better, don't be angry.

4. BE CURIOUS, NOT FURIOUS



"Keep your temper," said the Caterpillar.

"Is that all?" said Alice, swallowing down her anger as well as she could.

"No," said the Caterpillar.

—in the chapter *Advice from a Caterpillar* [2]

If you think a referee was mean, don't get angry. It doesn't help. When you read a negative referee report, be curious, not furious. (I suggest reading it quickly, putting it in a drawer for two weeks, and coming back to it with fresh eyes after you've been away from it and cooled down.) Ask "What can I learn from this?" Ask yourself what the report is telling you about your paper, or about the way you presented the results.

Even more important is to not be angry when you write a referee report! Again, be curious (as to what the author was thinking), not furious.

Anger impairs reasoning (and mathematicians know how important reasoning ability is). Anger and resentment are addictive and highly contagious, and there

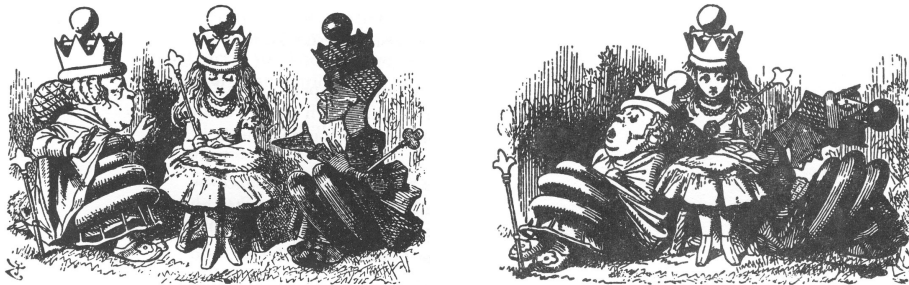
seems to be an epidemic right now. Letting go of anger and resentment can be hard, but it’s worth doing.

While there has been recent debate about the value of emotional empathy, I suspect that most mathematicians can see advantages of cognitive empathy (taking the perspective of another person). Be curious as to why someone did something you didn’t like. It might have been reasonable from their perspective, even if it wasn’t from yours. Perhaps it was just a misunderstanding. Communicate, ask questions, and try to understand, without suspicion or anger or jumping to conclusions.

I learned the phrase “Get Curious, not Furious” from an excellent new book by Dorothe Hellman and Martin Hellman (the latter is famous in cryptography due to the Diffie-Hellman key exchange [3], which was a central motif of the technical part of my JMM talk). Their book [4] explains why getting curious instead of furious will improve all your relationships and lead to world peace!

Speaking of relationships . . .

5. RELATIONSHIPS ARE NEGOTIATIONS, NOT ULTIMATUMS



Relationships are negotiations, not ultimatums. This is useful to remember when working with co-authors, or if you’re a dean or department chair dealing with faculty, or if you’re faculty dealing with your dean or chair. But it’s useful for *all* relationships.

I have needs and priorities, you have needs and priorities, let’s negotiate.

As I said at my lecture, if you talk to me after the lecture and I’m not willing to listen to you for as long as you’d like me to, you might say to me “but you told us that one should listen without interrupting”. And I might reply “But a relationship is a negotiation, not an ultimatum. I have needs, you have needs, let’s negotiate.”

6. BE KIND



Be kind to your students. Students respond very well to kindness. And if you’re a student, be kind to your teachers.

When you're writing a referee report, or sending out any sort of rejection letter, that's an especially important time to remember to be kind.

I wish I had learned earlier that kindness is magical. One of the hardest things for me is being kind to people who aren't kind to me. I figured that if someone is unkind to me, they shouldn't be rewarded with kindness. When I feel I've been treated unfairly, I feel like Alice in Wonderland (my alter ego), who stamps her foot and says "This isn't fair!" Sometimes it seems as if everyone wants to be Peter Pan, and wants me to be Wendy. (But I'm not Wendy, I'm Alice!) While it's very hard for me to respond to unkindness with kindness, things always go better when I do.

When I began to prepare my JMM talk, I thought the personal part would be to use what I've learned about sexism and discrimination to try to make our community better and fairer. Though the talk didn't end up explicitly dealing with gender issues, improvements that lead to fairness are good for everyone, not just women or underrepresented groups. And I'll add something that I think is especially important for women, given the cultural pressures on women and "The Wendy Syndrome" alluded to above. Namely, being kind doesn't mean that you always let other people get their way. Being kind includes being kind to yourself. And being kind can mean enforcing boundaries, sticking up for others, and standing up for what's right. But that can be done compassionately. As with all of my advice, I'm not at all good at this yet; it's a work in progress and it's a struggle.

7. WE CAN'T CHANGE OTHERS, BUT WE CAN CHANGE OURSELVES

Here's something I learned from the feedback I got from audience members after my JMM talk. Students were very appreciative that I told teachers to be kind. Teachers liked that I told students to be kind to their teachers. Someone told me that he knew that he should follow the advice in my talk, but he knew that he wouldn't. He wanted others to do so and change their behavior towards him and treat him better, but he found it too hard to take the advice himself and change his own behavior. That's a choice. Perhaps it helps to remember that we can't change others, but we can change ourselves.

Acknowledgments. I thank the mathematicians and computer scientists who came together to work on problems in cryptography, and many other communities I've been a part of over the years, for teaching me about community and the importance of good communication. I thank the Alfred P. Sloan Foundation for a grant that not only supports the workshops and conferences that brought together different communities, but also supports efforts to make our community more welcoming to women and other underrepresented groups in STEM and, hopefully, to everyone.

I thank my parents for naming me Alice and my siblings for giving me my first *Alice in Wonderland* books, which I believe led me to be more curious and adventurous than I might otherwise have been, and in particular helped me have the courage to give a non-traditional JMM talk. And I think the fact that Charles Dodgson was a mathematician might have helped turn me and other Alices into mathematicians.

The Tenniel illustrations were taken from <http://www.alice-in-wonderland.net>.

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