# To Serve AI
# (It's a Cookbook)

*James Hendler*

■ *James A. Hendler was recognized with the AAAI Distinguished Service Award at AAAI-17 for his contributions to the field of artificial intelligence through sustained service to AAAI and other professional societies and through government activities promoting the importance of artificial intelligence research. This article presents his recipe for success, with advice directed to newer AI researchers (and some notes for experienced ones as well).*

As the recipient of the 2017 AAAI Distinguished Service Award, I was asked if I would contribute a piece to AI magazine. A colleague suggested I might want to share my "recipe for success," and I decided to take the suggestion literally. Thus, this article is presented in the form of a recipe. In traditional cookbook style, I give a little background, then lay out the ingredients, and follow with some steps for putting everything together. The recipe is primarily aimed at up-and-coming researchers in the field, but there are a few notes as well for the more advanced "cooks," and thus I hope everyone will consider partaking. Follow these simple steps, and I believe that not just you, but everyone in our field, will be able to enjoy the results.

## Background

One of the things we are taught early in our careers as scientists is to avoid writing in the first person, to avoid self-promotion, and to stay focused in our own areas and avoid external involvements if we want to get promoted (especially in academe). In this article, I'm going to break the first rule, try to stay within bounds of the second, and urge people to break the third. I ask your forgiveness in advance.

More years ago than I would care to admit, I was a young professor giving one of my first invited talks. The speaker who preceded me was the already-famous Giovanni Wiederhold of Stanford University. As he was being introduced, with an intro that went on for quite a while — fellow of this, recipient of that, etc. — Gio leaned over and whispered to me, "You just have to live long enough!" I hate to disagree with Gio, a man who has been a role model for me over many phases of my career, but now that I'm older than he was then, and my own introduction has gotten longer, I realize he was not quite right. Living long enough is clearly a necessary condition, but it is not sufficient. If you really want to succeed in our field, you need to serve the profession, not just yourself.

# Recipe: Success in AI *à la carte*

*Serves:* The entire field

## Ingredients

Your time and commitment in helping the field of AI and the larger scientific community in a number of ways. The higher the quality of these ingredients, the better. The exact amounts are up to you — and you should make sure you are able to balance these with the rest of your career — but the more, the better.

## Preparation

### 1. Do Good Work.

This one pretty much goes without saying, but it's a necessary step. If you want to be recognized in the field and if you want to be able to help others achieve the same, you need to do good work. Good, but not necessarily great. There are so many incredible researchers in our field that killing yourself trying to compete is not necessarily the best way to achieve success. Strive to do all you can, but don't burn out trying to get yet another paper out the door. Find balance in your professional life between the many things you can find that are rewarding to do and the many things that can help other AI researchers as well. In particular, this work can include a number of service-related activities that will help both the field and your own career, as I'll outline.

### 2. Pay It Forward.

As you move through your career, especially as a researcher, there are many things you'll need to do. You'll want — and need — to attend, and publish in, workshops and symposia and conferences. These events don't organize themselves! Committees are needed to help organize and run the meetings, program committee members must be found to review papers, and so on. If you are attending a successful meeting, you owe it to all the people who have volunteered to do these things. As the recipient of the gift of their time, the best way you can repay that gift is to donate *your* time to future events. When you're asked to be on a program or organizing committee, please accept. It's a great way to help the field and to help others to be able to attend the kind of events you are going to now.

### 3. Say "Yes" to Review Requests.

Although we are living in a time where publishing is going through some changes (many for the better), in one way or another the process still requires people to read what is being submitted and to make comments — whether as formal reviews in the peer-reviewed literature or in the various other forms being experimented with in open forums and comment-based models. If you're a researcher, your career depends on the papers you get into journals, top conferences, and professional publications like *AI Maga-*

*zine.* In most places, papers need at least three reviews, some more, and thus for every paper you've had accepted, three people (not including editors and others involved in the production of the publication) have spent their time. While this step is a more specific instance of paying it forward, I call it out particularly because it's becoming harder and harder to find reviewers these days, since AI publication is booming. We've reached the point where many conferences are starting to limit submissions in some ways, and several journals I'm involved with are looking at instituting some kind of (nonbinding) agreement that if you publish a paper with them, you're expected to review three papers over the next one to two years.

Senior colleagues, I know that there are more and more demands on your time. I know it gets harder and harder to find the time to do the reviewing. However, our students and other junior members of our field cannot succeed unless we do it. I admit I cannot say "yes" to everything I'm asked to review, but I try to do what I can. Unless and until new ways of publishing emerge, we need to support the current model.

### 4. Volunteer.

As well as agreeing when asked to do things, sometimes it pays to be the one who offers to do things. AAAI and most other professional societies have a lot of committees and other volunteer opportunities, and they need people to fill those spots for the societies to continue. One of the first positions I ever held for AAAI was with the Spring Symposium Series. I had attended one of the meetings and really enjoyed it. I thought this (then new in AI) model of a set of AI meetings held in one place, combining the intimacy of a workshop with the social scale of a conference, was a really great idea. I talked to the chair of the committee organizing the series and asked, "How can I help?" A of couple years later, I was the chair. While this step has a bit of "be careful what you wish for," as it was indeed a lot of work, it turned out to be professionally rewarding for me, as well as of value to the field. The people I met, both the senior people creating the meetings and my more junior peers who were attending, ended up being an important social network that brought me into contact with many people from all parts of AI, not just the particular area I was pursuing at the time.

### 5. Remember, We're All in This Together.

That last point, about meeting people from all over the field, is crucial. When one is immersed in a particular research area, it's really hard to find the time to track what else is happening in the field. However, when you're involved in the various kinds of service activities I've been describing, you meet people from other parts of AI as a matter of course. Chatting with someone over dinner is one of the easiest ways I've ever found to learn about what was hot and who was doing it. This natural networking also meant that when I needed to find someone from another

part of the field to keynote a conference, to write an invited article, or to edit a special issue, I knew who to contact. And this outreach also worked in reverse — people looking for someone to do those things often knew who I was, opening up these kinds of opportunities for me, my students, and my colleagues.

6. Represent the Field.
Knowing what is happening across AI, from activities like all of the aforementioned, is also important as one continues to become involved in activities that span more of computing or science in general. As well as volunteering for AAAI and other AI activities, as my career has gone on, I've had more opportunities to get involved with other professional societies, government agencies, and various other activities in which I was often the sole representative of the AI area. A number of these activities offered great opportunities both to meet people from the much wider scientific community and to help them understand the role AI played in computing and in science more generally. In these positions, it was absolutely crucial that I have a broad knowledge of what was happening in the field — often I was asked to comment authoritatively about aspects of the field I was not personally involved in. Between what I'd learned from the many dinners with others and the social network I'd developed through the various activities I was involved in, I was often able to provide an adequate answer when one was needed in a hurry, and I knew who to talk to when more time allowed me to call the contacts I'd made in other parts of the field to find out what was going on.

Senior colleagues, as the level of activities you are involved in grows, you'll often have the chance to represent not just AI but the field of computing (and even, in some cases, the whole area of technology). This broad reach often opens the door to really exciting possibilities. For example, when *Science* was looking for a computer scientist to join the Board of Reviewing Editors for the first time, I was lucky enough to be asked. I served on this review board, joined in several activities with the more senior boards

and editors, and was able to help find opportunities for people in computer science to write for the wider scientific community. Opportunities on government boards and other such organizations tend to follow from becoming known as an effective representative of the field, which, in turn, can have a significant impact on policy, funding, and other activities.

6. Consider the Unusual.
A number of times in my career, I've been asked to consider an opportunity outside the normal realm. In most cases, these requests were unexpected and my first instinct was to offer a polite refusal. However, taking that deep breath, listening more closely, and saying "yes" has led to some of the best opportunities in my career. For example, a couple of decades back I got a call from someone to tell me I had been selected for something called the Defense Science Study Group (DSSG),[1] run by the Institute for Defense Analysis under funding from the Defense Advanced Research Projects Agency (DARPA). Since I didn't know I'd been nominated for such a thing, and hearing that it was a commitment of over 20 days a year for two years, I thought this was a nonstarter, but instead I said, "Tell me more." Long story short, I ended up accepting and this was an experience that changed my life. As well as experiencing some amazing things (watching flight operations on an aircraft carrier, riding in helicopters and tanks, flying the B-2 simulator, and many others), I met an incredible group of people.[2] Some of the members of the group I was in continue to be my friends and professional connections. The people who volunteered their time to help us learn were an incredible group, many of whom became senior mentors to me in later stages of my career.

While joining the DSSG was a boon for me, it was also a chance to be an ambassador for the field. The places where you don't expect to end up can often be the places where others are hearing about AI from an expert for the first time. I was often the first serious AI researcher that many of these important people had met, and so I

had the opportunity not only to learn from them, but also to teach them about the importance of AI. Many of these people went on to serve on advisory panels, funding boards, and policy groups, and to be engaged in other activities that influence the course of science and science funding. I hope the time I spent helping them understand our field gave them a better appreciation of the reality of AI, rather than the science fiction vision many had held before we talked. The benefits of this step are rarely as direct as many of the others in this recipe, but in the long run, these activities may be some of the most important.

7. Make a Difference.
The time I spent in the DSSG introduced me to a number of people in the US Defense community and allowed me to introduce them to the importance of artificial intelligence. It also led to my being asked if I would serve for a year as an AI funder for the Air Force Office of Scientific Research — another of those unusual calls I accepted. This, in turn, led to my being asked to interview for a position at DARPA, and I ended up spending over three years as a program manager there. Those were early days for both AI agent technology and the World Wide Web, and I created programs in each and one that combined the two, the DARPA Agent Markup Language[3]. In fact, during those three years, I controlled what was then the largest single funding budget for AI technology. This was an opportune time to be at DARPA, because it was during the "AI winter," and I was able to help start some opportunities in both DARPA and the wider government and thus could be a contributor to a new growth in funding and, in my own small way, help influence the thaw in that winter and a growth in opportunities leading to the incredible period of productivity that AI is now in.

DARPA allowed me to be at the fulcrum of a lever that could really make changes happen, but it certainly wasn't the only place such change could occur. Others of my colleagues, many of whom are former winners of this award, helped in other ways. Keeping AAAI going during the lean years required significant contributions of time and ener-

gy, and many volunteered there to make a difference. The growth of the internet and the web, and the clear need for AI technologies in search, e-business, and data mining, led others to create startups or to join major companies, leading to a significant increase in the visibility of the field. Most of these people continue to serve the field, not just in creating hiring opportunities, but also by serving on committees and helping conferences and all of the things previously mentioned.

8. Create Opportunities.
As your career advances, and if you're following the previous steps in this recipe, another way to give back to the community will present itself. That is, as well as serving in various roles, you can be someone who helps create the opportunities for others. This outreach can include running workshops and symposia, editing special issues of journals, and other activities that allow more members of our community to get to know one another and to exchange ideas, the life blood of science. Beyond these activities, paying attention to the community and dedicating your time to its needs can be an important way to make larger things happen. For example, at one point when I was involved in the AI planning community, I realized that we had a growing group of researchers, but that we didn't really have a forum to exchange technical details on a continuing basis. So I called a few better-known colleagues and suggested that we run a conference on the topic. In 1992, we launched the AI Planning Systems (AIPS) conference, and I was the first program chair (volunteering to do this is the best way to help get a new event off the ground). The conference later merged with a European workshop series, and it continues today as the International Conference on Automated Planning and Scheduling — still going strong after 25 years. In 2002, I helped create, and was the program chair for, the International Semantic Web Conference, now accepting papers for its 17th year. The Web Science Conference is now going into its 10th year, another one where I was the first program chair. I also served on the steering committees or in other roles in these conferences

while they were getting off the ground. I don't know how many total papers have been published in these meetings, but I do know that many of the emerging leaders in these areas gave their first talks at these conferences. Many of these people are now running the meetings, and many of my later students have had a venue to publish their work. What goes around, comes around (see step 1).

9. Look for Role Models.
This may be the most important step of all, and it actually includes all the others. When I was invited to write this article, I must admit I was of mixed mind. As mentioned at the beginning, I've been conditioned in the over four decades I've been involved in the field to avoid talking about my service activities, as opposed to my research. However, one of the things I learned over the years is that most of the people who devote so much time to our field do so quietly and out of the limelight. The program chairs of major conferences are forgotten long after the keynotes and papers are still being cited, the editors of the journals are rarely as well known as the authors of their top papers, and some incredible people at places like DARPA have contributed more to our field over the years than I will ever have the privilege of being able to do. If you're interested in helping our field, or if this article has whetted your appetite for becoming involved, then these are the people you need to find. I promise you, if you approach the chairs of conferences, the editors of journals, or the members of organizations and committees, they'd love to talk. We're always looking for people to join in helping AI to grow, and we're happy to share tips on making that happen. I was lucky enough to learn this early in my career, and I was able to find incredible role models to emulate. They say imitation is the sincerest form of flattery, and I hope those of my role models seeing this article will recognize the debt that not only I, but the entire field, owe them for all they have done.

## Final Note

Not everyone will be fortunate enough to become fully involved in all of these

preparation steps. Luckily, this recipe will serve to keep our important field going even if you manage only one or two of its steps. As I hope I have shown, the benefits to the field can also result in benefits to your own career. *Bon appetit!*

## Acknowledgements

## Notes

1. dssg.ida.org.

2. Also in my group was Eugene Spafford, who wrote a description of the activities we participated in and the people we met. His description is available online at spaf.cerias.purdue.edu/dssg.html.

2. en.wikipedia.org/wiki/DARPA_Agent_Markup_Language.

**James A. Hendler** is the director of the Institute for Data Exploration and Applications (IDEA) and the Tetherless World senior constellation professor of computer and cognitive science; and the head of the Computer Science Department at Rensselaer Polytechnic Institute. One of the originators of the semantic web, Hendler was the recipient of a 1995 Fulbright Foundation Fellowship, is a former member of the US Air Force Science Advisory Board, and is a Fellow of AAAI, BCS, IEEE, AAAS and ACM. He is also the former chief scientist of the Information Systems Office at DARPA and was awarded a US Air Force Exceptional Civilian Service Medal in 2002. Hendler is the editor in chief emeritus of *IEEE Intelligent Systems* and was the first computer scientist to serve on the board of reviewing editors for *Science.* In 2010, Hendler was named one of the 20 most innovative professors in America by *Playboy* magazine and was selected as an "Internet Web Expert" by the US government. In 2012, he was one of the inaugural recipients of the Strata Conference "Big Data" awards for his work on large-scale open government data and in 2013, he was appointed as the Open Data Advisor to New York State.