

SIAG–FME Interview with
Jean-Pierre Fouque

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SIAG-FME: *Thank you J.P. for interviewing with us. You are editor–in–chief of SIFIN, the Journal on Financial Mathematics of SIAM, which is now in its 10th year. Could you explain quickly what SIFIN, what is its mission and which goals it tries to achieve?*

Jean-Pierre Fouque: Thank you for offering to interview me and giving me the opportunity to present my view on the journal. The first thing, and this will come back later on, is that SIFIN is a journal of a society. This is very important and we will see that makes some differences compared to other journals. In terms of the goal of the journal, I'm just going back to the editorial policy of the journal and highlight some points that really define the journal: It's a journal about theoretical developments in financial mathematics and addressing computational challenges in financial mathematics. The audience is formed by academic finance researchers as well as practitioners. The journal should address any branch of financial mathematics and articles published in the journal should be well-motivated and presenting mathematical development related to modern finance. In terms of algorithms, significant improvement on computational tools, not merely incremental but significant improvement is required. I guess this describes very well the journal – we can go more into the details of it, if you like.

SIAM: *Maybe first, could you describe the internal workings of the journal? Some in the audience will know this very well, but I hope that there are also Ph.D. students and Postdocs out there who don't know yet so much how a journal actually works. Yes, I understand, you can submit an article, you go the website, you put in the information and you submit the file. But what is then going on between I'm submission and getting some time later a decision?*

Fouque: Again, it is important that SIFIN is part of SIAM. SIAM has many journals, more than ten or twelve, I didn't count. And there is a huge machinery at SIAM which makes the online process actually very easy and very efficient. So what is going on when you submit an article? At first there is a check by the SIAM staff called quality control, that the article meets the requirement of editorial rules, in particular that you have signed that you are not publishing somewhere else. They check for plagiarism, see if there is any part of the article which has been already published;

this is automatically checked. This all happens even before the article reaches me. This is some mechanism to check the quality of the article, not the content.

Then it comes to me, comes to my desk – everything is online – and usually I’m very quick, as I’ve been doing that for five years. As soon as it comes to me, I try to treat the paper the next day, I’m not sitting on it, and I’m trying to be very quick. I read the article, I’m trying to make my own opinion. My first job is to decide if the article belongs to SIFIN or not. I will come back to the number of submissions later on, but there is a number of submissions that I just reject from my end, because the article obviously doesn’t fit the editorial policy of the journal and therefore doesn’t belong to the journal - without even talking about the quality of the article. If I just reject it, it takes two days and you receive an answer with a nice note saying that this is not the right journal for your work.

Some other papers are obviously too weak to make it and I make the decision myself, we have a few of them. But then, as soon as I decide that the article could fit the journal and the quality is at the level of going to a review, I choose an associate editor. We have a list of associate editors, you can check the editorial board, with all the expertise. I’m trying to find the best associate editors who has expertise in the specific topic of the article. Also I’m trying to assign an equal number of papers to all the associate editors, not to put a huge load on one or two associate editors. This is my job, once I do that, then it’s in the hands of the associate editor who usually reads the paper, I guess, makes their own opinion, and their job is to choose referees. We require two referees per article. The associate editor will contact referees; sometimes referees decline for any reasons: because they are too busy, because they do not want to get into that area. But the job of the associate editor, and I think this is a very important job, and maybe the most difficult, is to get referees to accept to review the paper and also trying to get on the back of these referees to get the report on time.

Once the reports are in, the associate editor reads the reports, makes their own opinion, writes a recommendation in view of the reports and their own opinion, send that back to me. And here we have several decisions that we can make: Either it’s a reject after review because the reviewers are recommending rejection and the associate editor recommends rejection. Usually I follow the recommendation of the associate editor, and so I reject. Or I can suggest a major revision if the referees indicate that the revision to be performed is substantial; or a minor revision, that can be a very small amount of revision which can be done within one month. Then I send the feedback back to the authors. They do their revision, send back the paper, and we go again, round two: I send it back to the associate editor who makes their recommendation by themselves or send it back to the referees depending on the size of the revision, or the importance of the revision, and then back to me. Sometimes there is around three. Usually two rounds are the usual amount of interaction. In the end it is: Accept; accept with minor revision; or reject. An article can be also rejected after two rounds, that’s a bit unusual but is something that happens. Once the paper is accepted then it’s in the hands of SIAM. Then they will ask the authors to provide the .tex file and all the pictures and all the files. Then an editor at SIAM, a professional editor, will work on the paper to fix typos, fix everything. This is very professionally done, I’m not doing that. The SIAM editor will interact with you about what is called the proofs. And then we will publish; I recall that SIFIN is an online publication, so there is no paper publication. That’s how it goes.

SIAM: Thank you. You mentioned already the numbers. Can you tell me maybe a little bit more: How many papers come in? How many make it to acceptance in the end? How long does it take on average?

Fouque: We have a lot of statistics. It is really great to work with SIAM because they have all the statistics for all the journals. So it's easy for me to pull this out. Roughly we are in a steady state since a few years and the number of submission is between 170 and 180 papers per year. That's kind of steady. The number of papers accepted per year - not those submitted in the same year, but accepted per year - is between 35 and 40. This gives you the percentage of acceptance, right, you can do the math - let's say 40 over 180. It's in the low end of SIAM. It's not easy to get accepted, we are a difficult journal, but this is a quality. That's how we ensure the quality of the papers. We publish 1000+ pages per year; it's used to be a single volume until 2017 and then, since 2017, we have volumes and issues: Issue 1, 2, 3, 4, one per quarter. But it's always around 1000+ pages per year published. This gives you also the size of the papers published, the average size is about 25, maybe between 25 and 30 pages. These are the numbers, I hope that answers your question.

SIAM: *And the average time of a review?*

Fouque: Let me see . . . this year we are at ten point seven months.

SIAM: *From a submission to publication?*

Fouque: Yes, up to publication. So I wish it could be a little bit less. I do my part, I don't lose any time, I don't sit on papers. The bottleneck sometimes is getting the referees' reports, that's where it takes the most time, making sure that the reviewers are sending their reports. But they do a good job, I mean I know, I'm also doing referee reports, I know it's a difficult job and it takes a lot of time. But this is where usually the most time is spent, getting the reports.

SIAM: *OK. Coming back from what you said before, the broad description what SIFIN tries to achieve as a journal. Do you think it is achieving this, or is it on a god track to accomplish it? Or are there things which it does not in the way as it should as a journal?*

Fouque: Well. So I mean the goal of the journal obviously was from the beginning to be in the top tier of the journals. I think we are achieving that. I mean we are part of the main journals in financial mathematics, along side, to cite a few, *Mathematical Finance* and *Finance and Stochastics*. Here I want again to stress the difference with the two journals that I just cited: it is that we are a journal of a society. So everything is run by academics, everything is run by colleagues. We have committees, committees selecting the editor in chief, for instance - it's not the publisher selecting an editor in chief. It's really a community with people elected, and that makes, I think, our journal extremely stable, SIAM is a very stable society. So I think we have achieved the ranking of the top tier of financial mathematics journals and I hope this will stay and even improve - if it can be improved. This was our goal, and I think we have achieved it.

SIAM: *As editor in chief you are somehow in a pretty singular position to have an extremely good overview over the field since you're getting all the papers, you're locking on all these papers. Did you find that over the last, let's say five years or so, there were significant changes on what gets submitted? Which topics are currently important, could you described this?*

Fouque: This is important: We had a crisis, a financial crisis, a few years ago and this has affected the research and research areas in financial mathematics. It's important also for the journal to understand where are the new topics and the new areas for adapting the editorial board. So each year I'm adding associate editors, and I take this into account to make sure that we are covering the new areas of financial mathematics. Among the topics that have been developed in the last few years I would say papers on high frequency trading, limit order books, introduction to modeling with fractional Brownian motion have been quite popular in the last few years. Other topics such

as systemic risk, counterparty risk, CVA, networks, financial networks, are now very important and of course nonlinear modeling, BSDEs and mean field games have appeared as a tool in finance as well. And of course, I have to say that this is important, tools from machine learning. So far it has been more on the side of new numerical methods, using machine learning as a numerical method for solving a problem in finance, like portfolio optimization, for instance. But also on the side of robust hedging, I've seen a lot of submissions in that area. This gives you all the new topics, not really new, but what we have seen in the last ten years. And of course the old and classical topics in financial mathematics that we always see continue to develop.

SIAM: *I think one word that was conspicuously absent of the list you gave is somehow the word “fintech”, which is a huge keyword that is out there. Do you think this is something which will also play a role for the journal, or do you think this is rather something which is outside the scope of the journal?*

Fouque: No, obviously not, and I was a little bit careful: I said tools from machine learning, that's maybe what I mean with fintech. When your question is here if fintech will reshape the mission of the journal, my answer is no, I don't think so. The journal will be still financial mathematics, but obviously fintech and tools from artificial intelligence will be part of it. I don't think it will reshape it, but it will be part of it and will be integrated. We are seeing some submissions in this area. It's not always easy to see if it's really rigorous mathematics and if it contains original ideas. So it's not yet clear how this will affect the journal, but it will - but not reshape the journal, I don't think so, rather be added to it.

SIAM: *Speaking about new things: besides what's going on there in research, there is also something new about the journal: The journal has now introduced a new format which is called Short Communications. Could you explain what this is exactly and what is the thought behind offering this additional option?*

Fouque: We decided at our meeting of the editorial board last summer in Toronto to create this sort short communication section of the journal, the goal is less than 12 pages. And the review time is reduced to one month. We try to stay within one month, and we reply with only two decisions basically: reject or minor revision. There is no major revision, to keep the time. The goal was to give the opportunity to have a quick publication, because this was maybe lacking a little bit in our area, instead of waiting 10 months or more to be accepted. If you have something which is making a big difference, which is a significant contribution, which can be explained in less than 12 pages, then *Short Communications* is the right venue. It can be either in mathematics, fundamental mathematics, or algorithms – and the section will likely be oriented towards algorithms in some way. If you want to publish that right away and try to have the audience of SIFIN and the SIAG-FME to be aware of that, this is a nice way to do it. So far we had eight submissions and only one accepted and published. We had the first accepted and published, and I encourage you to go to the SIAM/SIFIN web page and look at the paper as an example – I don't want to cite and publicize that paper, but I encourage you to take a look at it. Another one is almost accepted, and so after a few months we will have two. They are coming at the end of the issue. Again, we have an issue per quarter. So the goal is really: short length - twelve pages – short time - one month – publish it. That's the idea.

SIAM: *So this was one change, are there any other changes you foresee for the journal? Should there be new initiatives to change the journal to be better in disseminating research, or do you think with this change you are on a good level now?*

Fouque: This is of course a good question, and it's always a recurring question. There is always

a thing which is coming back, that is special issues. Doing special issues either on a topic with a dedicated editor, or special issues for a conference. We have not done that. I think we cover the field well, I probably don't need to include a special issue on a topic fitting the journal, because we already cover all the aspects. Maybe a special issue associated to conference, maybe we could think about it, that's something that maybe I want to discuss. I mean I'm in my last year as editor-in-chief, maybe the next editor-in-chief would be able to discuss that with the SIAG-FME. Why not having a volume or a special issue of SIFIN dedicated to papers of the biannual meeting, the SIAG meeting? Maybe this is something we could think of. The other thing that worries me a little bit, and this is general for all the journals and in particular the journal of mine, is: OK, we publish, we do all the process, but in the end: Do really people read the papers? That's my concern. And I see it from my own point of view: I am unable to read all the papers, there are so many. And they are on arXiv, they are on SSRN, they are in journals. So maybe what we could do is to give more visibility to SIFIN, at least to our group, to this SIAG. What I did is that, I think it's every three months, the SIAG-FME list receives an email with publications for the quarter, and I hope this helps people to focus on these few papers and maybe take a look, click on it and look at the papers. My worry is that the papers are published, but then they are published among many. The goal is making things more visible that people read the paper, look at the paper. The other thing we could think of is maybe prizes. This has always been one of the issues, and this could be also discussed between SIFIN and the SIAG-FME: maybe a prize for the best paper, these are the things that we could think of to raise the visibility. I didn't do it, I didn't have time to do. But this this could be a good idea.

SIAM: *I think one of the main points we want to highlight in this in this interview is in particular to present the journal to young researchers. So I picture myself now a young researcher who thinks about submitting a paper to SIFIN and well, some may have advisers which provide a lot of support. But as somebody who has not an adviser providing adequate guidance for the first submission: What should somebody who wants to submit the first paper to SIFIN keep in mind?*

Fouque: Well, the advice is: Write an excellent paper [laughs], that's the advice. But if you are talking about a student, a graduate student, writing the first paper, I mean I have met that situation, I am advising my own students, and I know that writing a paper is very personal. Different people have different ways to write papers. Some people will write pieces and put the pieces together. Some people will not write for three months, and at some point start writing, and basically the first draft is definitive. That's my way to do it, it is more like an exam. But keep up. And it's like telling a story, I mean writing a paper is like telling a story. You have to keep it well-motivated, to be very interesting, and keep the attention of the reader. But basically, one advice would be to go to SIFIN and look at the papers which have been published. This should be a role model for good papers. They need to be well-motivated, I think in our field the motivations are important. Original mathematics, highlight the original mathematics, also make sure that the content of the paper is well positioned with respect to the existing literature. This is always one of the criticisms of the referees: What is it exactly you have done which is different from or new from what is existing? Try to really address that question right away. Offer a good numerics if there is a numerical illustration or a numerical part of the paper. It has to be extremely well, done very carefully and with all the attention needed, that's it. Write the best paper you can, get the literature, make sure you have all the relevant references about the topic - and then submit it.

And when you do a revision, if there is a revision, really address all the questions of the referees. Don't try to skip and try to work around, that's the best way to get it accepted in one round: take into account all the questions and issues raised by the referees and answer these questions.

SIAM: *Looking on the same topic from another perspective: We as academic community, what do you think can we do better to prepare young generations of financial mathematicians or financial engineers? Should we think about changing what and how we teach, or training students in specific skills which we don't train them now?*

Fouque: Yeah so obviously we are living a revolution or a tsunami with artificial intelligence and fintech and machine learning and I think machine learning should be part of the tools that we teach. So far maybe the area of computational finance or empirical finance for that we really need to have machine learning for our students. And in fact the students are demanding for it. So I see it in the admission of our graduate students. Everybody wants to put a machine on it. Even if they have in the back of their mind "I want to do financial mathematics or mathematical finance". They want to do machine learning. So I think this is something we should integrate in our teaching without compromising the strong background in probability, analysis. We need to keep the background in mathematics.

So for instance, if you teach probability, we are thinking about that at UCSB, and integrating some topics that usually we don't address in our courses like high dimensional probability. Well when you work in high dimensions, what does probability looks like, that's maybe a new way to get into the good points of teaching concentration inequalities. We don't do that usually. So why not doing concentration equalities alongside with large deviations. That would be helping a lot of students, I guess. So these are the things we can do and our teaching is modified, is affected by this tsunami of artificial intelligence. And we have to teach it. We have to create the courses and we have to integrate those topics into our teaching. Obviously.

SIAM: *So, for a young researcher, what advice would you would give them: Which topics to choose, what should they do in particular for being well positioned for a career in financial mathematics.*

Fouque: Yeah, so of course it depends, I mean a career in academics is a little bit different from a career in the industry. But in any case, again, machine learning should be part of what they learn. And so I would recommend to integrate that in the study. Do internships as much as you can, I mean at least one internship, in your study to see how the industry is working. That's a very, very good thing to do. And computational skills, make sure that your computational skills are up to the level which is expected in the industry, and even in academics. And I'm not a computational person, I am well from a generation where computation is not as important as it is now. Even for a research academic career you need to have these computational skills. I mean you write a model, implement the model. So work on machine learning, do internships, know the industry and your computational skills result not neglecting the theoretical. That would be my advice. So it's a lot to do.

SIAM: *Well, maybe to turn it a little bit personal. If you would be currently in the situation starting out in a Ph.D.: Would you go again for financial math? If so, which kind of problems, which kind of topics would you choose? What do you think is currently exciting for you when a Ph.D. student? Or would you say that you would do something completely different?*

Fouque: So although obviously I would choose UCSB to integrate surfing in my studies [laughs]. But besides that, I would say, but this is my own taste, I would say: probability, probability, probability. You know the saying: Location, location, location. Here it is probability: Probability, probability, probability. So, more probability, that that would be my learning. Learning the background and the theory of probability. And of course I mean applications to financial mathematics would be very attractive to me, but I would first concentrate on having a strong mathematical

background to attack financial mathematics. Not to start with financial mathematics not knowing the background. I would still do probability.

I mean if you look a bit about the, let's say, historical volatility like this when Dupire is talking about historical volatility, with constant volatility and local volatility, stochastic volatility. And now we had a switch from linear problems to non-linear problems with uncertainty. So these are, to understand these you really need the mathematical background. I mean you go from linear PDEs to non-linear PDEs, you go to nonlinear expectations. So this needs a solid background to address those questions. And these are real questions, these are real questions from the industry. Look at the new topic of networks, financial networks. So this is a huge area. There is a lot to do, a lot to learn, a lot to discover. But you need some background there. And so that's what I would do: I would try to get a very solid background in probability, because this is what I like, the kind of mathematics which goes with it. And then trying to get into financial mathematics, but stay close to the real problem of industry, understand the market, understand the issues, understand the financial stability for instance, and then do some mathematics about it. That's what I would do.

SIAM: *OK. You mentioned a couple of times during the interview how important it is for you that the journal is part of a community of SIAM, and the activity group in financial mathematics and engineering. Is there anything you would wish that this activity group, and in particular also the biannual conference that the activity group is holding, do, to be better contribute to the financial math community?*

Fouque: Yeah. So, first I need to congratulate you, I congratulate the SIAG officers for doing this newsletter. I mean this is really helping, I think is a very good thing to have. What we could see maybe more: I already talked about prizes, more recognition, making sure that we have a set of prizes to recognize career, young researchers, best paper. I mean we need to do more on that side. And other areas of mathematics they do that. So. Or engineering. So why we're not doing the same thing? So I think thinking about new prizes would be good. I would say for instance that there is this SIAM News which is read by a very large audience. Why not trying to get more papers or articles in this SIAM News, asking, trying to find people in our community to be ready to write general audience papers. We have already some, but maybe more exposure on what we do for the general audience. Other things that we do, but we could do better, or more, like mini courses, more mini courses associated to conferences, summer schools. We have summer schools, but these are really good, these are very, very interesting for graduate students. So let's see who can organize summer schools. And I think these are the things that we do, but we could do more, and better.

SIAM: *OK. And maybe as a last question: you mentioned that you will soon be stepping down from your position, but nevertheless do you have long term vision where you hope that the journal is going, and what else the journal can achieve in terms of visibility in the SIAM community.*

Fouque: Well, I'm repeating myself, this is a journal of a society, a very stable society. It's among the top tier journals on financial mathematics. The goal would be to be the top journal [laughs]. I don't know exactly how you measure that, but that there is a possibility and this is what we should be working. This is what we try to do. I've been trying to get the best editorial board that I could get, I think we have a fantastic editorial board, and this will continue. I feel that the young, our young colleagues are very eager to serve in the editorial board and they do a very good job. So I'm not worried about that. We have choices. We have very good people. I hope I have not screwed up too much during that five years [laughs]. I was given this journal from René Carmona

and Ronnie Sircar who started it, this was a little bit scary,... you know, I was scared... Now after five years I think we have a good stable condition of the journal. We can do better, always we can do better. I tried to do a few things, but I wish that my successor will be successful in doing that. And again who that will be I do not know. That will be decided by a committee on journals at SIAM with a recommendation, I'm guessing that we will be asked, the associated editors, if they have ideas, and I will be asked, and then we will try to find the right person to take over and move the journal even better. So that's how it goes. I don't know exactly what else I can say.

SIAM: *Thank you very much for taking the time for this interview.*