研究者間コミュニケーションを根本から変える
文書管理の変革

Victor Henning,

Co-Founder & CEO, Mendeley Ltd.

講 演 内 容

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日　　時：　平成２３年１２月８日（木）15：00－17：00

場　　所：　新霞ヶ関ビルLB階201D号室　科学技術政策研究所会議室

講演概要：

　昨今科学技術情報流通の変革がめまぐるしく、電子ジャーナルもこれまでの冊子相当物の電子化を超えたサービスが本格化しつつある。研究者による論文管理も新しい時代に入り、単に文献情報を各個人が電子的に管理するだけでなく、ソーシャルネットワーク機能との連携による、論文の共有や評価まで行えるようになった。

　　講師である Victor Henning 氏は、もともと音楽レーベルを作りたいという夢を叶えるために、Sony ミュージックなど音楽や映画業界で各種の研鑽を積んだ。その後、氏自身がBauhaus-University of Weimar 大学にて心理学の学位を取るときに感じた文献管理の大変さを解消するために、Mendeley と呼ばれるツールを 2008 年に他の二人の学生（当時）と一緒にα版として開発した。その際、オンラインミュージックカタログで成功した LastFM の投資家の支援を得、また、英国で著名な俳優の支援を得て居室を借りることができた。Mendeley では各研究者が主に文献書誌情報をクラウド上で共有することで、効率よく研究情報を手に入れる環境を研究者の協同で行うことができ、さらに、各文献についての利用度やインパクト、ならびに研究者のパフォーマンスが定量化できる仕組みを持っている。ツールとして web 上の ASP サービスとローカルクライアントソフトの両方で文献を同期しながら管理することが可能で、スマートフォンやタブレットデバイスにも対応している。すでに 1 億 3 千万の文献情報が登録されており、既存のトムソン・ロイターなどの書誌データベースの推計 4000 万文献を大きく引き離している。大手出版社の一部では Mendeley 上で論文の最初の 1-2 ページまでを見せることでプロモーションを行なっている。また、API を通じて誰でも Mendeley 上の定量データを入手し、他の情報を組み合わせて、共同研究・共同出版の程度や、研究評価など新しい定量化された情報を得ることも可能となっている。また、MIT を始めとした多くの大学や企業とのコラボレーションも行なっている。今年（2012 年）からは図書館を経由した研究者へのアカウント一括導入により、機関単位での研究パフォーマンスが測定可能となる予定である。

　氏はこのような新しい文書管理ないしは情報流通環境が既存の科学研究や学術情報流通を変えていくことを確信している。ジャーナルが持つ機能である、比較的閉じた世界（学会や出版社）で行われるピア・レビュー、読むべきものの選別、権威付け、この 3 つ機能のいずれも Mendeley プラットフォーム上で複数の研究者（outsider）が協同で行なうことで取って替われると主張、学術誌の価格高騰とオープンアクセスへの流れがそれを後押しするとしている。

講師略歴：

　文献管理と SNS が融合したツール Mendeley の CEO である氏は、2009 年の立ち上げから当ツールの開発運営に携わり、今や 100 万人を超えるユーザーと 1 億 3 千万の文献を搭載する世界でも類を見ないクラウド型の研究情報プラットフォームに仕立て上げた。現在氏は英国王立芸術協会のフェローを務める。また、心理学の専攻で Bauhaus-University of Weimar の学位を有し、映画や音楽業界での職務経験を持つなど多彩な経歴を持つ。

スライド

「研究者間コミュニケーションを根本から変える文書管理の変革」

2011.12.8

【林】それでは、時間となりましたので、NISTEP の所内講演会を始めさせていただきたいと思います。

　私は、NISTEP で客員研究官をしております日本化学会の林と申します。よろしくお願いします。

　きょうは雨で、しかも寒い中、ご足労いただき、ありがとうございます。今回、Mendeley の CEO の Victor Henning さんが来日するに当たりまして、4 つほど企画がございまして、おとといは NII の SPARC Japan のセミナーで、Mendeley とほかの、EndNote や RefWorks 等の文献管理ツールと比較するイベントを開催しました。昨日は大学評価機構で、スカラリーコミュニケーションの将来を語るイベントを行いました。今日は、とことん Mendeley について、Victor の生い立ちまで含めて語ってもらって、後でもう一度説明しますが、イノベーティブなツールがどうやってできたか、その先にあるスカラリーコミュニケーションの将来は何かということまで彼の視点から大いに、60 分、通訳なしの英語で語っていただく講演会です。ちょっと日本人にとってはしんどいかもしれませんが、頑張っていきたいと思います。

　ちなみに、明日は千葉大の大学院生に向けて、若い大学院生向けに Mendeley を実際使ってみましょうというワークショップをやられると聞いています。それで土曜日は鎌倉に観光に行って、日曜日はお帰りということで、ハードスケジュールの中に来ていただいて、Victor には大変感謝しております。

　それでは、簡単に、今回のお題であります「研究者間のコミュニケーションを根本から変える文書管理の変革」と、ちょっと今から思うとややこしい名前だなと思いますが、いずれにせよ、所内講演会の開催趣旨についてご説明いたします。

　電子ジャーナルはもう当たり前の世界になりました。学術電子ジャーナルというのはチューリッププロジェクトと呼ばれている、エルゼビアに端を発するのか、その前の OCLC かアメリカ化学会のプロジェクトによるのか、諸説いろいろありますが、そもそもまずインターネットの前は学術情報流通の情報自体をデジタル化することから始まりまして、それがウェブで審査ができるようになり、ウェブを通して流通するようになった、それが 1990 年代後半からの話だと思います。具体的な製品で挙げてしまうと、Scholar One Manuscript でオンライン上で審査が完了し、ScienceDirect では雑誌数が今やもう 2,500 誌が 1 つのプラットフォームを通してアクセスできるようになっている。ただそれがディストリビュートされるだけではなくて、次は CrossRef などを通じてほかのジャーナルとリンクされる、あるいは Web of Science や PubMed 等の書誌データ、あるいは引用データからつながるようになって、さらに発展して、今はもっと違うクラスのデータベース、例えば物質データ

ベース、遺伝子とか化合物データベース、もしくは人のデータベース、すなわち研究者の DB と繋がるようになって来ています。最近話題の研究者を同定する ORCID プロジェクトはこれだけでも 1 つの大きなシンポのテーマになるぐらいだと思います。加えて、ただ単にリンクというよりは、API 等を通して、マッシュアップして、いろんなもののデータベースから新しい価値や新しいサービスをどんどん生み出すようになっています。その意味では cross learn なんかが積極的にやられているというふうに理解できると思います。

　一方、学術情報流通は ARPANET から学術系で始まったのでしばらくは学術の世界で先行していたんですけれども、最近になって、もう電子でのコミュニケーションが社会で進んでしまっているというのは皆さんお気づきかと思います。ウェブの前は紙と電話とファックスを駆使して情報のやりとりを、特にジャーナル、論文集の場合ですと小さい編集をやりとりしていたわけですけれども、ウェブ以降になりますと、e メールがとりあえず浸透して、そのほかに BBS、日本だと 2 チャンネルとかいろいろありますけれども、そういうのがはやって、2005 年ぐらいからブログとか P2P とかスカイプなどの新しいツール、メディアが出てきて、先の話と明確な境はないんですけれども、SNS とかツイッターとかという形で、社会はもう既に多種多様にコミュニケーションを取り始めています。だけれど、まだ e メール以外のもので、スカラリーコミュニケーションでメインを張れているものは、今のところはまだ現れていないと言ってよいでしょう。この辺りも後で Victor に見解をいただくことになっています。

　もう一つ大事なのはストレージです。情報を保存していくところも、ここしばらくで随分変わってきました。ウェブとかデジタルの前は当然机の上とか、書棚とか、あるいは図書館にあるのを借りていたわけですけれども、それがとりあえず PC——と書くと怒る人もいるから括弧書きでマックとして——それで、そこの中に、パソコンの中にローカルフォルダーを切ってそこに入れたり、あるいは FD、CD、MO、DVD 等のところに保存する、ローカルに保存するという、今から見れば比較的小さいサイズで保存するという話から、ハードディスクに入れ、その容量どんどん膨大化し、あるいは比較的閉じた中のネットワークの中にあるストレージで見られるようになり、最近はクラウド、クラウド、クラウド、どこでもクラウドという話になってきています。

　この辺が全部関連してくるのはなぜかというと、研究者も情報の洪水の中に埋もれている。たくさん読まなければいけないしたくさん書かなきゃいけない。それで、研究費を申請するときはたくさん申請書を書いて自分の文献や関連文献を並べなきゃいけない。あるいは昇進するためにもやっぱり同じようにたくさんフォームを書かなきゃいけない。ここで出てくるのが文献管理ツールということになるわけです。

　勝手に 0、1、2、3 とフェーズ分けしたんですけれども、まずウェブ、デジタル化の前というのは当然自分の物理的なスペースに全部保管して、もしやりとりしたかったら郵便でやるしかなかったわけですけれども、1.0 ぐらいになると、自分のところのパソコンの中にファイルを保存して e メールで送れるようになる。それが 2.0 ぐらいになると、パーソナル

のウェブスペースに情報を置いて、それをシェアする。ここにあるよというコミュニケーションを e メールでやるようになると。ところが、今仮に 3.0 としたんですけれども、今はもうクラウドの中から人々がほかの人のデータとかも使い合って、それで必要なものを登録する。そして登録するときについでに評価もしてしまう、あるいはそれを SNS 上でやりとりするというところまで来ていると見ることができます。

それを具体的な文献管理ツールに当てはめると、まあ、0 はバインダーとかファイリング、これは製品名ではなくていわゆるほんとうにバインダーにファイルするということになるわけですけれども、1.0 に当たるのは EndNote が登場したときと言えると思います。これは PC のローカル領域に文献を保存して、主に執筆支援、引用文献を書くところで支援をすることになりました。2.0 で RefWorks が出てくると、ASP サービスでウェブ上に書誌情報をアップロードしてそれをシェアするようになりました。3.0 になって、今日お話しいただく Mendeley では Born Cloud という形で、ただシェアするというよりは co-creative、一緒にデータベースをつくっていって、一緒に評価して、どんどんサイズが大きくなり質もよくなるという、新しい形態が生まれています。きょうはご紹介できないんですけれども、3.0 タイプとしては、ごく最近出てきた Nature 系の資本が入っている、ハーバードの学生が開発した Read Cube というものや、TogoDocs と言う日本の東大の先生がつくられた医薬系のほうの Mendeley のようなツールがあります。実はおととい、開発者の岩崎さんと Victor でプレゼンしていただいたんですけれども、お二人がすごい意気投合していました。ということで、日本からもツールが出ています。

それから、念のため申し上げますが、1.0、2.0 の EndNote、RefWorks が古いということはなくて、彼らのほうも開発を進めまして、今は 3.0 の形態にどんどん近づけているという状態です。

さて、ここで書いてありますように、co-creating、co-evaluation というところまで来てしまうと、3.0 ベースのものはもはやもうただの reference management tool ではなくて、何といいましょうか、もうスカラリーコミュニケーションの中のエコシステムの中の 1 つのサービスとしてとらえていかなければいけないレベルまで来ていると言って良いのではないでしょうか。

まあ、ちょっと見てみましょう、ということで、すみません、これ、中身が空っぽなんですけれども、30 分前にインストールした EndNote の画面で、ここに文献を入れていき管理するということを PC のローカル上で行います。

それから、これが RefWorks です。これはウェブ上の、これは Chrome で見ていますけれども、RefWorks の、私が出版した文献のフォルダーで、ウェブ上にすべてこういう書誌情報があって、必要に応じてシェアできます。具体的に言うと、例えば私があるところで講演した、例えばここにあるのは、Wikimedia Conference でしゃべった内容の関連のある文献というのを入れておりまして、これは公開してありますので、この URL をお知らせすると皆さんに今見せた論文の少なくとも書誌は全部見られる形で共有ができます。

そして Mendeley です。これは後で紹介がされますので、ほんとうにちらっとだけ見せて終わりにしますけれども、こういった形で、reference management tool を学ぶことで将来のスカラリーコミュニケーションが垣間見えるのではないか、これが今回の講演会の狙いということになります。

　ということで、今日の講演会のゴールですが、最新のイノベーティブなツールをまずは勉強します。これは単なる reference management tool ではありません。次に、じゃ、それがどうやって開発されたかというところについても学びたいと思います。そのためには founder である Victor さんのバックグラウンドも聞きます。そうすると、イノベーションのオリジンがどこにあるのか、もしかするとわかるかもしれない。まあ、イノベーションを習うということ自体がロジックとして成り立たないのはわかっているんですけれども、ヒントを得るためにもどうして Mendeley ができたかについても語っていただくことになっています。

　そして最後に、では、こういう新しいツールを使ってスカラリーコミュニケーションの将来はどうなっていくのかということについてもかなりドラスチックなスライドが最後に出てきますのでお楽しみにしていてください。これを Mendeley を通じて語っていただくために今回 Victor さんに来ていただいたことになります。

　ということで、私のほうの概要説明はこれで終了させていただいて、早速ですが Victor に語っていただきたいと思います。

【Henning】　　Well, thank you very much for the introduction and also big thank you to Kazu and to Miki for inviting me to Japan. I really enjoy being here. It's my first time in Japan and I'm having a wonderful time. Thanks very much for having me today.

　　As Kazuhiro said, I want to talk today about how we went from basically being three guys in a virtual garage to possibly changing the face of science. And to start off with, I think not everyone may be familiar with Mendeley as a tool of what it does. I think before I go into the vision and my personal background and the background of the company and also what it could mean for the future of scholarly communication, I first want to give you a little overview over the tools that we have developed and the interfaces and what we can do with it. Also just to check, how long do you want me to speak? Sixty minutes? I think but leave some questions at the end. Right? So, 45 to 60 minutes, and then....

【林】　　Oh, yeah, you can use the whole 60 minutes.

【Henning】　　Great. I will.

　　So, a very brief introduction to Mendeley. When we got started with developing Mendeley, it was because we ourselves were researchers. I was a Ph.D. student and my cofounders were Ph.D. students, and we were just all facing the same problem. So all of us had just started our Ph.D.'s and my research topic was the role of emotion in

decision-making. And I had hundreds of PDFs on my hard drive; I think maybe 600 or 700 documents on the role of emotion and psychology and neuroscience and arts and literature and philosophy and medicine and marketing and advertising. And I wondered, "Okay. What is the relationship between all of these documents? How do the different ideas from the different academic disciplines relate to each other? And why isn't there a better way for me to keep track of all of those documents and what I've read?" I very often read a paper and I try to remember where I've come across a specific idea or a certain thought but I would just forget it. And at the time, I was using EndNote, so the tool that Kazuhiro showed briefly. And it was very cumbersome; you had to manually enter all of the data; you had to keep track of—if you had downloaded a PDF from a database, the reference file was separate, so you had to go back and download a reference file and IRS format or XML format and import that. And at that time, you also couldn't connect the XML file to the PDF, so those were kept separate. And you couldn't full-text search, so it was very, very cumbersome.

And so the idea that my cofounders and I had was: Why isn't it possible to have software like iTunes for music, where you can just import all of your music files and iTunes organizes your music automatically? Why isn't there something similar for research where you can import all of your PDFs and automatically organizes your research papers and extracts the necessary information for you? And so, that was the idea with which we went and started to develop a prototype and ultimately the product. And I'll talk more about how that happened later and how we got the idea and the team and also the money and the investment to do that.

But for now, just the general concept. So the concept is, Mendeley has free desktop software. You can just go to our website, mendeley.com, and you can download the software for Windows, for Mac and for Linux and just install it in your computer; it's free. We also have an iPhone application and an iPad application and the iTunes App Store.

And once you've installed the software, you can point it to a folder on your hard drive where you store your PDFs, or you can drag and drop lots of PDF documents into the software. And Mendeley will try to automatically extract all the relevant bibliographic information; so all of the authors and titles and journals, issues, page numbers, and basically take your collection of PDFs and automatically turn it into a structure database for you.

And so, in that structure database you can filter and search and sort; you can also read the PDF and annotate—and I'll show you that in a minute. And all of the information that people put into Mendeley, into the software, is then uploaded—sorry, I

skipped a bit there—it's uploaded to the site, the cloud computing service, to reuse. So that is what Kazuhiro explained, that we've gone from people just using their own tool for themselves to people uploading information to sites like Mendeley, so that other people can share and access that information and reuse it. Everybody benefits.

So I think I'll do a little demonstration, both of the desktop software and the websites. You can see what the software is like.

This is the Mendeley desktop interface. And if you've used iTunes, I think it'll look very familiar. On the left-hand side you have different folders and you can put your documents in the folders to organize them. Here in the middle you have your list of documents, and on the right-hand side you have information about the document you've selected. You can sort your library by authors, by the title of the document, by the year it was published in, by the publication journal, and also by when you have added the document to your library. You can keep track of what are the latest documents that you've added.

So, you can also filter these documents by keywords that you have applied to the document yourself. For example, I can click on this keyword here, "attitude theory," and you can see the keywords that I've given to the document are: emotion, affect, attitude theory, theory of research. You can select different tags and it will filter the list of documents.

We also tried to automatically extract the author keywords from the document. So, if you click on filter by author keywords, then you can see some keywords that the author has given to the document and you can filter by those.

Now, if you want to remember where you read something, you can also full-text search all of the documents. So, like I said, my research field was the role of emotions in decision-making. If I type in "emotion," it would search all of the documents for the keyword and highlight where it found something.

You can then open the document and you can also start to search within the document. For example, by start typing longitudinal, it'll already start to highlight the word where it's been found in the document.

And then, like, on a piece of paper, if you want to read in Mendeley, you can also switch to full screen and it highlights and add digital notes. And if you're collaborating with somebody else, then it's very easy to share these highlights and notes with other people.

All you need to do is to create a group in Mendeley. The Mendeley advisor group, for example, shares all of these documents. And when you drag and drop a document in here, the notes and annotations can also be shared and be seen by other people.

And so if you click on all ..., what you get is a news ... that shows you all of the research activity that's happening in the group. And you can see, for example, there is new people on Mendeley who do interesting stuff, and you can find out more about their research; you can discuss some questions that you may have. This is our internal Mendeley advisor group. People ask questions and you can answer and discuss. And you can also find out more about the different members of the group. There's almost 1,000 members in this group. And it's very useful to collaborate and keep track of what everybody is doing.

So, we also have a website, and on this website you can just log in with any browser, and likewise you see a number of updates from your research network of what people are doing. So, whether they have new publications, whether people have added new documents to specific groups; like this group here is called Future of Science. And people use it to ask questions and discuss.

Every user of Mendeley also gets a free profile, and they can use that profile to share information about themselves on Mendeley and on other websites. So, here, for example, you can upload a photo; you can enter your basic research interests, the topics that you're interested in, and you can add your own publications. This is very easy. You can do it both on the website and more easily in the desktop software. There's a folder here called My Publications. Any document that I put into this folder, My Publications, automatically shows up here on the website under My Publications. And so this is where I can give people public access to my documents, but I can also just show the bibliographic data and hide the PDF if I don't have the right to make the PF publicly accessible.

You can also see some statistics about how many people have been reading and downloading your publications here. And you can enter information about any awards and grants that you've won, your biographical information; you can see which public groups you are a member of; and you can enter your CV information down here.

And one of the nice features is, if you want to maintain your publication list and your profile on the website, then you only need to enter the information once and you can reuse it. We have this embedded profile widget, and if you click 'embed,' then it allows you to configure this little widget here and you can, for example, include design elements, like the Mendeley ribbon you can include or hide your photo; you can choose to include your biography or maybe just your publications. And so, once you're done configuring which information you want to include, you click here, and it's now copied the code into your clipboard and you can just copy and paste it anywhere, and it's like a YouTube video; you just copy and paste the code and you can create this little profile

widget. This is the code that you just need to copy somewhere to embed your profile.

You've also just briefly seen Kazuhiro's library. You can log in from any computer and access to your documents here. All of your groups on the left-hand side you can search, and you have all of your filters and tags available. If I just want to filter for the tag "emotion," now it's loading, and you can filter the documents this way.

Now, I think what's interesting—and that's the part that goes beyond the reference management—is, if you want to use Mendeley to discover new things about specific research fields or specific people. In my case, since my background is psychology, you can go to the groups section on the website and click to any field. In psychology this is the overview for the psychology section, and there's also the different self-disciplines of psychology here. And so, first of all, our users can write collaborative summaries about self-disciplines. This is like making Wikipedia entry about the discipline. And the popular tags here, they are the keywords that people most frequently use at the moment to tag the words, to tag the research papers that they're working with. So that shows you what are the popular subjects right now in the field of psychology on Mendeley.

If you scroll down, you can see what are the popular groups at the moment. So, the very first one here is called "neuro big trends," and it's about the big trends in neuroscience. This was created by this user here, who is a professor in Illinois, and you can see his profile information here. And so, as a user you can create these groups; you can add some keywords and disciplines. The disciplines here are: biological sciences, medicine and psychology, and some keywords, and little description of what the group's about. This group is all about collecting research, about the latest trends in neuroscience.

So, you can then click on papers to see which paper's on your group, and one of the documents that I found very interesting was this one here: "Sing the mind electric—principles of deep brain stimulation." You can click on that, and you can come to this page here, and it gives you more information about the article. You can find the metadata; you can find the link to the publisher. If we have the DOI or the PubMed ID, we link through the publisher itself. Here you can set a library resolver. We try to identify by IP address, whether you are a member of a specific institution. If it's not done automatically, you can manually set the library resolver.

There's the abstract, and you can get information about the author-supplied keywords, and also this is very unique—the readership statistics. You can find out how many people on Mendeley are currently reading this document, who have added the document to their library. This one has 22 readers on Mendeley. We can see whether

they are from biological sciences, from medicine, from psychology, whether they are Ph.D. students or professors or undergraduate students and which countries they're from; so United Kingdom, United States and Netherlands. And you can click on the preview and you can start reading the document actually. The first two pages of the document are free for you to read.

And if you then want to find out more about the references, you can click on the references tab, and we automatically extract the references cited in the end. And we also try to show you for each citation what the context is of the citation in the text. So here you can, for example, read what the authors are saying about this particular citation. And then of course you can click on the citation; you can search our database, find this document, and you can come to the next document and again start reading ... preview, the abstract, and you can discover related research. Mendeley looks at keywords from the article which we extract automatically, and it also looks at collaborative filtering. So, like Amazon does, people who have read this book have also read that book, and we try to do the same thing with research and show you which documents are read.

So, going back to the presentation, I'll skip about this phase.

I just want to show you quickly two more things. I'm afraid this is not in the slides, since I just added this in. These are two new features which are going to be released in the next two weeks. The first feature is called QuickSend, and that enables you to share documents more easily with other people. In this QuickSend, ... down here, you can add your contacts and import your email address book. And then you can see your contacts right here. And you can drag and drop a document on to any of the names, to share the document with that person. It very easily integrates the sharing to the workflow.

The other new feature is called Mendeley Suggest. And it looks at your existing library, the documents that you already have. And it tells you which are the documents are related and which might be interesting for you. You get personalized recommendations for new documents to read.

And this is the iPhone application that we have. It's also free in the App Store. You can carry your documents around with you. You can search the documents. You can see the metadata and you can actually start to read and zoom in the PDF on your mobile device and also on a tablet.

There are also Mendeley applications for android, and these are not developed by Mendeley itself, but they are powered by the Mendeley API, so we have an interface, application programming interface, that anybody can use to build applications with Mendeley data, so the overall database, but also with your personal Mendeley account.

If you log into, for example, Droiderey that asks for your Mendeley account information, and then it downloads your Mendeley library and your folders and also the groups that you're a member of. And all of this is free.

So I think that was a good overview of what Mendeley, the tool, actually does. And we've recently gotten a lot of attention, and actually, if you look at the current *Wired* magazine issue, there's a big story about Mendeley in there and it's also online on the *Wired* website, so you can read the entire article. And it talks a bit about the story that I'm about to tell you now, which is how we got the idea and how we got the money and the investment, and also about our personal backgrounds, like what was it that made us start Mendeley. And so, now I'll go back to the beginning and actually tell you about myself and how we got the idea for Mendeley.

So, myself, I'm 31 years old now and I was born in Germany. All of the Mendeley founders are actually German. And I was born in Hamburg. Then in 1999, in Germany, you stay in high school through the age of 18 and 19. I got my German high school diploma and I really didn't do anything special in between, except one thing, and that was in 1996—so when I was 16 years old—I woke up one night and I remembered that I had a dream and I remembered what I wanted to do. And that was, I wanted to have my own record label. I was playing music; you know, all of good Asian kids in Germany, they learn how to play the piano. I played the piano for 10 years. And when I was 15—so, one year before that—I became very interested in punk music. And I listened to lots of American bands, like Nirvana and Soundgarden and Pearl Jam, and I started to play base guitar. In 1996, this night, I woke up and I knew that I wanted to work with music and maybe have my own record label. And so I think that was the beginning of me actually becoming an entrepreneur. At that point, I knew that I wanted to create something myself and create something that I worked for and that was passionate about. And I hope that that's one thing that still continues today that, you know, I felt something and passionate about and that I want to work with. So it started there.

And I think for my parents it was a bit strange because my father had always worked in the automotive industry. And so I think Germany is quite similar to Japan in that way, that people who have gone to university, their biggest dream is still to have a safe job to work for a big corporation. In Germany, it's to work for Siemens, for BMW, for Daimler-Chrysler. My mother, who's Korean, she always wanted me to become a public servant, to become a judge maybe or a diplomat. And so when I told my parents in 1996, "You know what? I'm going to start a record label," they're like: "What? Music? Music is not a proper business. Music is not an industry. How are you going to earn money?" But I said, "I don't know, but that's what I want to do. I want to work in music."

And so I started buying lots of books about the music industry. Every book that I could get my hands on, not just the fun things but also the business things, I wanted to learn about contracts, about ..., about licensing and how the music industry worked. I was interested also in the business side of things and how to make a music record label work.

So then, after I finished my German high school diploma, in Germany back then, you still had to do either army service or civil service. And I actually chose army service. I was in the German army for about five weeks. And then they kicked me out because I'm allergic to eggs. I have egg allergy. And that was great, because suddenly I had one year of time before I started my studies. And in this one year I could work for a record label. That was in 2001. I got kicked out of the army.

Actually, first, I went to France to do an internship in a company that produced pistons for motors. Because my father worked for the same company in India and he had arranged me to do internship so I could learn French. But once I finished that in 2000, I went to Sony Music, you know, great Japanese company, and started to work in their talent scouting department. That was a dream job. I was just 20 years old. I started to wear spiky hair, so I became a little punk. I went to concerts. My job was a talent scout, so I went to all of those shows that the bands played. And I listened to their music; I listened to demo tapes. And my job was to find new artists, to find new talent and to find new ideas. And I think that was very useful for what I do today, to try to see things in a different way and see maybe what are the trends in your field. Basically, I was a trend scout for Sony Music.

However, I knew that if I wanted to have my own record label one day, I would have to understand about the business. And so I decided to go to business school. From 2000 to 2004, I was a business student at WHU Koblenz, a small private business school in Germany. It's very, very selective. You had to do tests to get into the school, but it was a good business school for me because they very much encouraged entrepreneurship and starting companies.

So then, in 2001, I still very much wanted to work in music, but at that time, Napster happened. The whole music industry suddenly started to explode. And I went to California to a record label called Revelation Records. And I doubt that any of you will know it, because it is a small punk label in a small garage in California, and people there, they go surfing in the morning, then they work for the record label during the day, and then, the evening, they either go to a punk rock show or they go surfing again. And when I was in California, I also got a piercing in my lip, so you can maybe still see I have a little hole in my lip here, and my father was horrified. My father was thinking,

"Oh God! What's happening? You were such a nice kid and now suddenly you have spiky hair and you have a ring in your lip and you work for a punk record label." But I think he had nothing to worry about, because I was still going to business school.

But I realized that the music industry was changing so much that you just couldn't really make a living anymore from music, because all of the business models were changing. Napster was happening; the industry and piracy were changing how you could make money in the music industry.

And so I had another big passion, and this other big passion of mine was movies. And so I went back to Germany and I started to work for a film production company. That film production company was called Helkon, and they were actually quite big. At one point, they had, in the German stock market, a capitalization of 500 million euros. They bought some American film companies. And then, in the last week of my internship they went bankrupt. That was an interesting experience. I swear I had nothing to do with it. It wasn't my fault. But it was an interesting experience to see how a business could waste money. So they wasted a lot of money. They had a big villa in Munich, and everybody in the company who worked there had a car. I was working both in the script department, reading movie scripts to do creative work, but I was also working in the accounting department, so I could see the money coming in and the money going out. And I thought: "Oh, this isn't going to go well for a long time." And it didn't. So they went bankrupt.

And so I thought, "Okay. I'm interested in movies and music," and the film industry also went through all of those changes. What happened in the music industry in 2001 was Napster and it started to lose revenues. In the film industry, around 2003, Pirate Bay and Bit Torrent happened, so the big sharing of film finance.

And so I became very interested in strategy. And I thought I want to understand more about how strategy influences different industries. And so, for my final thesis—in my business school we had to write two theses. The first one was a practical one, so you wrote it together with a company. And I went to Oliver Wyman, which is a big strategy consulting firm, like McKinsey or Westin Consulting in Germany. And I wrote about interactive television and how interactive television was changing the television industry. And it was interesting for me because, first of all, I realized that I could not do a job where I had to wear a suit every day and I realized it was interesting to know the strategy behind industry changes and how to analyze situations for future .... But I still realized, okay, I wanted to do my own company at some point. However, I took a little detour.

So in 2004 and three quarters, while I was finishing my master's thesis, I was also

running the entrepreneurship club in my university together with my Mendeley cofounder, Jan. And we were always looking for projects to do with the entrepreneurship club. And what we did was, we thought, "Hey, all the way through business school we always complained that there wasn't anybody who had opened a café or a bar in the little place where we were. There was no place for the students to go." And so we opened a café ourselves. And so we had to learn how to use power tools, like knocking down walls, putting down wiring, tearing out floors, working with electricity. We almost killed ourselves because we didn't know how to do it. But we ended up opening a café. And the day after the opening night, I moved away to do my Ph.D., because I had become very interested in research. While I was studying abroad, I had to write a term paper about film industry and film industry financing. And I didn't know how this whole publishing thing worked, so I just sent my term paper off to an academic journal, and the journal was called Media, Culture and Society.

And the journal wrote back to me and said, "Hey, this is a very good paper. We have some minor revisions that we would like you to make, but we're going to accept your paper for publication." So I thought, "Huh! This is easy. I can become an academic." And so I went into academia to the Bauhaus University of Weimer. And maybe you know the Flying Spaghetti Monster; it's a parody on creationist theories. And I just chose it because Bauhaus University was also a little bit of Flying Spaghetti Monster. It was mainly famous for arts and architecture, but it also has engineering and philosophy and media and computer science. It was a big spaghetti bowl of everything and I really loved being there.

During my time there, while I was doing my Ph.D., I still stayed in touch with a film industry. I organized a lecture series called GuruTalk, where I invited lots of famous people from the German film industry—producers, directors, screen writers, distributors—to talk about their vision of the future, of how they would think the film industry changed. And we ultimately took all of those lectures and transcribed them, and together with my Ph.D. advisor we published a book in Germany. That's actually quite a good selling book for German film schools and I'm quite proud of that.

However, towards the end of my thesis—and I've told you that we had this big problem managing our research—and towards the end of the thesis, we felt, "Well, you know, maybe if we have that problem and every other Ph.D. student we're talking to has the same problem, maybe we should actually do something about it and maybe we should start a company."

I think it was, again, a choice that we made between safety and the risky thing of starting a company, because at the time, I had published quite a lot of papers. I had won

a couple of awards. So it would've been, I think, very easy for me to become a professor somewhere and I really enjoyed being an academic and the academic lifestyle and having the freedom to think about things and to do research. And Mendeley was obviously just a risk; we didn't know whether it was going to work out. But I always knew that I would regret if I didn't try to start the company, because we became very passionate about this idea of not just doing reference management, but somehow doing something that could benefit academia as a whole and doing something with academic data that other people could work with.

So my two cofounders and I, we decided to start the company and we knew that we needed money. Initially, it was a three penniless Ph.D. students. That's me, Paul and Jan, the three founders. And what we did was, we took all of the money we had saved, so our entire savings in the bank. And we went to CeBIT, which is a big computer fair in Germany where different computer venders exhibit. And we went to a Belarusian outsourcing company and asked them to build a prototype for Mendeley. With the prototype of Mendeley, we then, in the summer of 2008, approached investors. The person we approached was Dr. Stefan Glänzer. And we knew him because Stefan Gläzer was an academic himself. So he had a Ph.D. in economics; he had been a guest lecturer at Jan's and my business school. So Jan and I had actually published a case study and one of the books that he had put out with one of our entrepreneurship professors. However, Stefan was also an entrepreneur and he was quite famous for being one of the most successful entrepreneurs in Europe, because the first thing he did was an auction site; so the German version of eBay, which was called Ricardo. And he sold Ricardo eventually for $257 million. So we had a lot of money.

And then he went on and moved to London and he became the first investor and chairman of a startup called Last.fm. And Last.fm ultimately became the biggest music site in the world with, I think, 40 million users. And they sold that to CBS, the American record and television company, for $280 million. Just as we approached Stefan, he was about to sell Last.fm. So that hadn't happened yet, but obviously we were very lucky because it was good timing.

And he was looking for a new challenge. And he immediately understood the problem that we were trying to solve and he was passionate about the idea. And he very much saw the similarities of Mendeley and Last.fm, because Last.fm was a social music service. The idea was that if you listen to music on your iPod or your iPhone, or on your computer on iTunes, Last.fm will keep track of the music you listen to, and then it will generate a personalized radio station for you. It tells you which songs you might like and it streams music for you.

And we told him we want to do a Last.fm for research. We want to help people manage academic information and then aggregate the data and then recommend to people what they should read and maybe eventually give people access to academic content. Actually, this photo here is outside Caffè Nero, which is a coffee chain in London. And five minutes before that photo, we had agreed by handshake deal that he would become our cofounder and first investor. This is actually the first official photo of Mendeley after the company was started. A historic document.

So, the next question I have is—and I've asked some people already: Do you know Monte Python? You know Monte Python and the life of Brian? So, Michael Palin, obviously, is one of the members of Monte Python, so he played some of those characters in Monte Python movies. And as it happens, Michael Palin was also the first landlord of Mendeley. This is Covent Garden in London. And if you walk off the square in Covent Garden and you leave Covent Garden market and you turn left, then there's a little bookstore. And on the top floor of the bookstore is Michael Palin's production office. Michael Palin was quite famous in the UK not only for Monte Python but also for travel series. Michael Palin traveled the world and he did television series about his travels. And my cofounder Paul, he had done the website of Michael Palin's travels.

When Paul told Michael Palin that we were starting this company Mendeley, he said, "Well, if you want to, you can use my office." You can see up there, that on the left it's me, in the middle it's Jan, on the right is Paul. And we are in Michael Palin's production office. So that was the start of Mendeley. And I think we were very lucky to have investors like that and a landlord like that. He'd sometimes drop by. And actually, Michael Palin today is the president of the Royal Geographical Society because of all of his traveling.

However, I think one of the biggest lessons for me in entrepreneurship has been the emotional rollercoaster, how difficult it is to just try to keep steady and keep calm, because on some days everything will go great; you know, like, you have the handshake deal with your dream investor; he comes onboard, invest in your company. You believe nothing can go wrong now; we have the best investor in Europe; we have Michael Palin as landlord. What could possibly go wrong?

And so, this is a couple of photos that I want to show you from the life of Mendeley. And as you can see, maybe on the clock up there, it's one o'clock in the morning, 1:10 a.m. in the morning. And this is the launch of the Mendeley invitation-only alpha version. And it was terrible. We are all very tired at this point. You can see Jan's face. This is Paul, my cofounder. He's already looking a little bit crazy, or panicked, I'm not sure. And this is me. I'm in total despair at this point, because everything just keeps

going wrong; the server keeps crashing, and we just can't get the website running, and we promised to our investors that on this date we would send out the public alpha version. And so this was our state of mind at that moment.

But we had this vision that kept driving us. And so this vision was that humanity has big challenges. And this is a talk from Tim Berners-Lee from the TED Conference two years ago. And he said, "All the time, we're very conscious of the huge challenges that human society has: curing cancer, understanding of brain for Alzheimer's. But all of this knowledge is locked up in the scientist's computers and it's currently not shared. And we need to get it unlocked so we can tackle those huge problems." And so we had this vision that if we succeeded with Mendeley, we could help scientists unlock all of this information and get it shared so that we can help humanity tackle those big problems like cancer and Alzheimer's.

And so we kept going, and I think it's important, in my opinion, if you do a startup, that you do it with close friends, because it helps you share the bad moments and the good moments. We had some good moments. In 2008, later that year, this is our Christmas party. As you can see, we are playing rock band on our Nintendo Wii. We had a lot of fun there. And a little bit later, we won an award. This was the Plugg 2009 "Startup of the Year" award. And so, for the picture we all tried to jump at the same time. But as you can see, it didn't work, because people didn't jump at the same time. We look a bit weird. And one of us later realized that this actually looks more like attack of the zombie coders. But, yeah, we had a lot of fun.

We also won a couple of more awards in 2009 and 2010; so the Startup of the Year Award 2009; we won the Best Social Innovation Award by TechCrunch in 2009. In 2010 we were the Best Education Startup in Europe, chosen by Telegraph. And this year we were the winner of the Tech Track 100 from Sunday Times and Microsoft. So those were the highlights of being recognized for what we did.

Now, we're actually a pretty big team. We are 35 people, with London and New York-based offices from a variety of European and American institutions. We have investment from the founders of Skype, the founders of Last.fm and some of the people behind Warner Music. And we have research funding from the European Union, from JISC, which is the UK Joint Information Systems Committee, and from UK Technology Strategy Board.

And so this is what the Mendeley office looks like today. You can see lots of people working in an open space. This is actually our only developer who speaks an Asian language. Siwa Chang. He's Chinese. But to organize we use a kanban board. This is my cofounder Jan. And as you can see the kanban. And we found that this is the best way

for us to organize our development process. We have little cards, as in kanban, where we write down the different tasks. And people pull the cards and stick it along the kanban board to visualize the progress of any project. And so I found that, to talk about innovation, I think it's important to not only have a vision that gets people inspired, I think you need to know where you want to take the company. And while I do very much believe in user testing, I believe the first step has to be the vision. The first step has to be you wanting to know what you want to achieve. And I don't think you can get that by asking a panel of users. And that goes back to, I think, Henry Ford—you know, the inventor of Ford Motor Company—and he said, "If you have asked a panel of people what they wanted, they would've said, 'I want a faster horse carriage.' They never would've said, 'I want a car.'"

So, I think with Mendeley, too, we had a vision that we wanted academic working to be different; we wanted it to be more collaborative; we wanted it to be that I as an individual can easily share with other people, but then everybody benefits and the academic community gets data they can work with. And so that was the vision that drove us and the vision that by doing so we can advance science and we can advance humanity, like Tim Bernars-Lee said. And I think you need to have an environment where this innovation can flourish.

We have a very flat hierarchy in the company. We always try to have arguments and open discussions about merits. And it became very difficult when the company grew to more than 20 people, because I think once you have more than 20 people, you additionally bring in management to have a middle level of management. And suddenly, the developers were no longer talking to me, but they were talking to their manager, and the manager was talking to me. I lost touch with what people were working on. And it was very hard to keep people motivated because they just didn't realize what the vision was anymore. And you have to constantly communicate the vision. In the company, I give regular talks to the entire team, maybe every month or so, where I talk about different aspects of the strategy and the vision. I talk about how the different things we do relate to each other, what our competitors are doing in the marketplace, how the marketplace is changing, how academic publishing is changing, how communication and scholarly communication is changing and how our vision helps us navigate through that.

I think my role as founder and CEO of the company is really to guard that vision and to communicate it both inside and outside to meetings like these. But we've also found that you need to balance this innovation with process. We didn't have a good process for a long time; everybody just worked what they wanted to work on. And we

just somehow naively assumed that since we all share the common vision that we'd all somehow work out and everybody would work on the same thing, and of course that didn't happen.

Before we had the kanban board, we did an audit of the different projects that were happening in the company at the same time. And I'm not lying to you, we had a spreadsheet of 150 projects which had been started and paused and were in different stages of planning at the same time; 150 projects in a company of 30 people. This was obviously crazy.

So, what we did with kanban is, we now only have four projects, and all of the projects that are ... from the kanban board and we visualize the progress of each project and we have each team present the progress at the end of the week, so that we can always get feedback on how the project progresses and also to showcase how it ties back into this big overall vision that we have. So we always try to tie the small things of what every individual is working on and what every project is doing to the vision of Mendeley. And I think without this we wouldn't be able to move quickly and to innovate.

So, I want to talk a bit now about things that are coming up, to give a sense of what Mendeley has achieved, and since I think I'm actually speaking quite long already, I want to talk about the future of scholarly communication.

It may be interesting for librarians in the audience. Mendeley is launching a joint product next year with a Dutch company called Swets. So that's one of the biggest subscription agents in the world. The joint product will be for libraries to see the usage of the content they have subscribed to in a dashboard like this. They can upload the list of subscriptions; they can see how is the usage for each of the journals and also what is the activity of library patrons and—I think I have this here, I guess. You can see what people are reading and what are the popular documents and so forth.

This will launch in January, 2012, and it will be one of the revenue streams for Mendeley. I'm not going to talk much about the business model now, but you can ask me questions later if you want to.

Right now, we've become the world's largest research collaboration platform with more than 1.3 million users. And so the biggest user base that we have in terms of where people have signed up for, the 15 biggest ones are listed here. It's Cambridge, MIT, Stanford, Imperial. You can see it's really the world's leading research institutions where researchers are adopting us. And none of this would be possible, I think, without the Mendeley advisor program. We have a network of 815 Mendeley advisors around the world; you can see the map here. And Mendeley advisors really are academics, Ph.D. students, post-doc, professors, who want to help us spread the word, because they share

this common vision that we have. And I think that's why it's so important for innovation to keep talking about the vision, because if you do not share the vision, then nobody will understand why they should help you. And I think it's because we've constantly communicated our vision from the start about making science more open, about sharing academic data, about enabling people to work with the data, that people started to write to us and say, "How can we help you? How can I help you spread the vision of my campus to get more people involved and to get more people become a part of Mendeley?"

And so, Mendeley advisors, they get access to the new features that we're testing. For example, the MendeleySuggest teacher, the advisors have been testing us for a couple of weeks; the QuickSend will also be rolled out to advisors first, and Mendeley advisors get a premium account and some stickers and T-shirts, and Mendeley advisors can set up local user groups and give presentations to really show to people at an institution how Mendeley can help them and how Mendeley benefits the institution and how it can also be a replacement for tools like EndNote and RefWorks and help people to share their resource on campus.

And I think this is one of the amazing things that happened. Within a little more than two-and-a-half, three years, we've become the world's largest research database. If you look here, in January, 2009, we started literally with zero documents in our database. And our users have now uploaded 130 million documents to the service. And so we reduplicate those, because since it's crowd-sourced, many researchers will upload the same document. If it's a popular paper in biology, then maybe 100 people or 1,000 people will upload it at the same time. And so we reduplicate that, and reduplicated, we have about 50 million unique documents in our database. And for comparison, there are some commercial products which, I think, are quite expensive even, Web of Knowledge, and SCOPUS from Elsevier. I understand that the pricing is five to six figures per year if you want to have access to those databases. And we have surpassed that volume already. And currently, about 500,000 documents per day are being added to Mendeley. And in November I think we had 10 million documents added per month. I think by end of December we'll have 140 million, maybe 145 million, and it's still accelerating. This database is an incredible resource.

And what makes it special, in my opinion, is it's not just metadata and abstracts; in some cases it's full text. It's also, because it's crowd-sourced, it comes with social information. For each document you have these interdisciplinary demographics of: who are the readers of the document, how many readers does it have, where are they from, what is their background, what are their interests? You can also see the tags, the keywords, that the community has given to research papers. That really enriches each

document. You can see what people are thinking about the document. We are doing collaborative filtering to do related research recommendations, so you can find out what is related to the document. And you have the real-time reading statistics, so you don't have to wait for citations. As you know, citations take a long time to accumulate. And we want to show you right now how many people are reading a document, where they're from and what are they saying about it.

And all of this information is actually made available through our open API, free of charge. It's "dev.mendeley.com." It's under Creative Commons license, so you can just use the data and reuse it in any way you want, commercial and non-commercial. The only thing that we would like you to do is to give a Creative Commons attribution to the source of the data.

So, one of the projects that we've been working on that makes use of our data is called JISC DURA. And that stands for Direct User Repository Access. And the idea is that many people are already adding their publications to Mendeley, and they upload them to their Mendeley profiles. As I've shown you, I've done so with my own publications.

Now, the problem with repositories very often is that the researchers do not add their papers to their repository, because they forget it or they don't have an incentive to do it, because it is extra work. And so the JISC DURA project is about automating the deposits, so that if we identify that you are affiliated with Cambridge, for example, then your publications will be sent to the Cambridge repository manager, and the repository manager can then determine whether they want to include it in the public access repository. And vice versa, we index the repository to give more visibility to the open access content that is available from the university.

And we also recently concluded the Mendeley and Public Library of Science Binary Battle. The idea was that both Mendeley and PLoS have an open API. And we thought, "How can we encourage people to build applications with the data that is available?" We put out some prizes, and the top prize was $10,001 for the best application. And I've been asked, "Why 10,001?" and the answer is because it's a binary battle. And we have some prizes from PLoS for the runner-up and for the best mash-up, so for the best mix of both datasets. And Amazon web services were also sponsoring free cloud computing time on the AWS infrastructure.

And we found some great judges to help us determine which application should win those prizes. So the judges were people like Tim O'Reilly of O'Reilly Publishing who coined the term, "Web 2.0." Werner Vogels is the chief technology officer of Amazon and also considered one of the fathers of cloud computing. James Powell, for example, is the

chief technology officer of Thomson Reuters. And so, some of the applications that have been built are about visualizing and measuring academic impact. ReaderMeter, for example, lets you enter an author name and it gives you a list of publications from the author, ordered by number of readers of the document, and it retrieves the list of coauthors for that person from the Mendeley API and calculates a couple of indices of the research impact of the person. And you can also see for each individual publication where the readers are from and what their academic disciplines are.

Collabgraph is an example of visualizing the relationships of documents in your library by co-authorship.

ClEMs is a tool which lets you import the Mendeley library and creates semantic links between the different documents in your library, so then you can visualize how the research that you're dealing with relates to each other.

PaperCritic is a tool for open peer review. At the moment, it focuses on already published literature, so you can take any document in the Mendeley database and you can write a review and rate the paper, for example, for originality or for argumentation, and it also tracks automatically when people are talking about a paper on twitter.

And the winner of the contest is openSNP; so, openSNP is a service for users of 23andME or deCODEme. These are personalized genomic services. They will sequence your genome and then give you information about your phenotype and genotype and your genetic traits. And openSNP encourages people to upload their raw genetic data so that they can discover other people who have similar genes and have similar gene expressions. And this information about phenotypes and traits is then automatically enriched with research papers from Mendeley and PLoS, so you can find out the latest research about your genes, and researchers can contact you to find out more about your medical history to ask you questions and to download your raw dataset. And the judges felt that this was actually exactly the thing that Tim Berners-Lee was talking about, about making raw scientific data available to the community and enabling new ways of sharing data and enriching data with other information like literature.

So what Mendeley is doing is, it is creating these rich datasets of how documents relate to each other; for example, you can ... already created links like this document supports another document, or this document refutes another document, or they use the same method. And so what we're doing is, we're crowd-sourcing semantic annotations and raw data to build something like the global grain of science.

Now, actually, I think I'm also out of time, but I think I should carry on talking about this, right?

What does it mean for the future of scholarly communication? Now, I'm sure you

know this blog, the Scholarly Kitchen, which is the blog of the society of scholarly publishing. And this was a blog post that had a lot of discussion. And the question was: Why hasn't scientific publishing been disrupted already? And Michael Clark, the author, he started by saying, "When Tim Berners-Lee created the Web in 1991, it was with the aim of better facilitating scientific communication and the dissemination of scientific research. Put another way, the Web was designed to disrupt scientific publishing, from the start. But it didn't. So far, it has disrupted music and films and telecommunications and pornography, pretty much anything, but not publishing. So, why? And Michael Clark went on to argue—well, actually, before I come to that, I think some of the background around this. Maybe you're already familiar with this, so I'll go through this quickly.

I think the main challenges that are happening these days for academic publishing are thea so-called serials crisis and open access. The serials crisis is that the subscription costs for journals keep increasing, but library budgets are either stagnant of shrinking in many cases. You have a 20-year view, almost, of the consumer price index and, by comparison, the journal subscription cost. And I believe this is mainly driven by for-profit publishing ... Elsevier's and Wiley's and Springer's and Nature's who, because they are publicly listed companies, they have to show revenue increases and increases in profitability every year. They have almost no choice but to increase the price. It's part of being a public company. But obviously, if the library budget is shrinking, this cannot go on like this.

In terms of open access, you have more and more calls from government to make science free for all. This was something that happened last year. The U.S. government was asking for input on whether to make any research that have received public funding free for all. I think you may know that this already applies for life science research. I think if you have an NIH grant, then your research output has to be publicly available in PubMed, but there's a one-year window where publishers can commercially exploit the research. But expanding this to all other fields of science, I think, would be great for science, but is potentially quite scary for many publishers who depend on also monetizing the back catalog. So this is the backdrop to this question: Why hasn't this been disrupted already? And Michael Clark says it's because of three things.

The first thing is that journals provide validation; journals provide peer review system. And this is a function that nobody else assaulted. Second, he says journals provide filtration; they facilitate content discovery. So you have a huge amount of information, as Kazuhiro said, and you have to in some way find relevant information for you. And so, journals, by selecting content, they provide some form of filter to tell you

what is interesting and what you might want to read. And lastly, he said journals provide designation; they provide the prestige for authors. It's important for an academic to be published in *Nature* or *Science* or proceedings of the National Academies of Science, to get tenure and to get a permanent position. Basically as a marketing scientist I would call this branding; it's simply about the brands that the journals have created. It's the brand's nature that you want to associate with yourself. And it doesn't actually say anything necessarily about the quality of your research. You may remember one high profile case this year was a big study in science about arsenic-based life, where some researchers from NASA claimed that they had discovered bacteria whose main metabolism was based on arsenic. And it was published in *Science*, so it received a lot of credibility and a lot of press coverage, but it turned out to be wrong. It was premature. But because it was in *Science* that had this prestige that people thought, "Okay. This is a big story."

Now, what happens if these things, validation, filtration and designation, could be provided by outsiders, like Mendeley, not necessarily only Mendeley, but other tools that are being built? And I think this is happening at the moment.

Let's look at the first thing: validation. To provide peer review, at the moment, tools like PaperCritic, they do post-publication peer review. This is only for content that has already been published. But I think it's not very difficult to imagine a world where you have something like archive, which is the preprint repository in physics, or if you have university repositories like Cambridge, where people put their working papers and we already indexed archive, we are already working integrating with repositories. You will have more and more working papers and free peer review contents in Mendeley, and so people are already using Mendeley to create annotations and to write little mini reviews written only for themselves of content. Now we want to get people to share those reviews more openly so that if you are an academic, you can look at a document and you can find out what other people are saying about that paper. I think it's not a big step from post-publication peer review, like on PaperCritic, to pre-publication peer review that is crowd-sourced. I mean, currently, we're not doing it, but it's not difficult to imagine. This is the first thing that journals do which outsiders could do as well.

Second, you have filtration. I think this is actually the easiest to do by external parties. I mean, in music. Who did filtration before? You had radio stations. You had record labels who do albums. And with iTunes the album was not the important unit anymore. People wanted to pick themselves what they wanted to listen to. It was about individual songs. You had services like Pandora in the U.S. or Last.fm, which are recommendation engines for music, and they became very, very popular and they

became the best way, almost, to discover new music. You also have Facebook. People share a lot of music on Facebook, telling their friends, "Oh, have you heard this band? Check out this YouTube video." You have social discovery. And I think in Mendeley, as I've told you, we are rolling out Mendeley Suggest very soon. This discovery through recommendations algorithms is already happening. And TogoDoc has recommendations. This is already happening. And I think it's becoming commonplace.

But you can also have the ability to discover groups in Mendeley. It's not just algorithms; it's other people. On the Mendeley website, you have more than 100,000 hand-curated bibliography lists, a group of some ..., a hand-curated list of important research on a topic. It could be big trends in neuroscience; it could be biology classics. Everybody, every researcher, is now becoming a content curator and can do what a journal editor does, almost, by collecting information and putting it together and saying, "This is my list of documents that is important for a given subject." Content discovery is definitely going to be disrupted in this way. That's my opinion, anyway.

Lastly, you have the topic of designation, and I think that is probably the most difficult one. Currently, you have, like I said, the brands, like Science and Nature, which have been established over hundreds of years, and there's a lot of prestige to publishing in specific journals. I don't think this is going to go away overnight.

But one thing that struck me was, as part of the Mendeley API challenge, as part of the contest, there were actually three different applications which were about designation; three different applications which tried to measure impact and influence in academia. I've shown you ReaderMeter, which is about individual influence and individual impact. Then another one is called Total-Impact, and you can define groups of literature for which you want to track the impact. This group here is for the Bergman Lab. I think actually this is the person who also invented Eigenfactor. The Bergman Lab created this group to keep track of its impact across many different media. If you go to Total-Impact—I don't have a big screen chart in here, but you can see it's tracking citations; it's tracking article downloads in PLoS; it's tracking twitter mentions; it's tracking back and forth; it's tracking readers on Mendeley. It's really trying to capture hundreds of ways of prestige, alternative ways of measuring whether somebody has an impact on the academic community.

Another one is called ScienceCard, and ScienceCard is a project by the head of ORCID. So you know ORCID is this new initiative about author identifiers. And Martin Fenner developed ScienceCard which help—by the way, I heard Japan is the only place outside of America where baseball is popular. Martin Fenner actually said, he wanted ScienceCard to be something like a baseball statistics card for an individual researcher

where you could see: How were their citations in SCOPUS and CrossRef and how is the readership in Mendeley and other services? I think we are going to see a lot more tools like this that potentially, maybe not in the next two years, not maybe in the next five years, but certainly in ten years, can displace brands like Science and Nature to provide different means of evaluating an individual's impact on science.

So, summing all of this up, with library budgets decreasing and open access mandate expanding and validation, filtration and designation now increasingly being offered by outsiders, what can publishers do to be relevant in the future of academic and in scholarly communication?

My feeling is, the first thing is, in terms of getting around the budgets, since budgets are mainly B-to-B, so we sell to a library, which has a library budget, but we have a lot of demand from individual users who want to access content. And there are obviously startups like DeepDyve who are trying to work on this that publishers can try to establish new distribution channels for their content to reach individuals.

And I believe another way is to add value that goes beyond the content itself. It can be additional services on … user experience of tying in with workflow tools that can be providing additional data, like raw data or interactive data, that you can actually—and I think you mentioned somebody was here from Elsevier's Article of the Future contest. Interacting with graphs, interacting with raw data and papers to maybe play with the data yourself and maybe replicate. All of these things, I believe, are very valuable that publishers could charge for.

So, distribution channels, I think, you have multiple options. You have the Web, you have desktop software like Mendeley, like TogoDoc, you have mobile devices like Android, like iOS. You have different business models that you can try. There's paper download, there's rental, there's limited or unlimited subscriptions. For example, the Spotify model is about unlimited rental that you cannot keep the documents, or you cannot keep the music, when your subscription ends.

You could do revenue-sharing bundles with other services. And I've come across several studies from the Research Information Network, which is part of the British library in the UK, which talked about: How much would publishers have to charge per article download if they wanted to completely replace all of the bulk subscriptions? And I think the numbers roughly work out between 3-5 dollars, or pounds, per article. And I think it would be more efficient to do it this way, because in my experience the bulk subscription model is very inefficient. When I was a Ph.D. student, there were so many papers that I couldn't get access to, because my library couldn't afford the subscription, but they had subscribed to a lot of journals that very, very few people were actually

using. You have simply by having centralized purchasing a very inefficient model, and I think user-driven acquisition is the keyword that might make it more efficient for users which might provide publishers the same revenue, or even more revenue, because I think there's a lot of demand for this, but which is also more efficient in terms of the capital use.

And in terms of adding the content, as I've said, you can provide additional datasets, additional statistics, about the document, about how it's being used and where, additional analysis. So, Mendeley is not the only company who does these post-publication peer reviews. There's a company called F1000, which has built a business around post-publication peer reviews that had crowd sources. Elsevier is investing a lot of money in SciVerse, which is an application platform that allows applications on top of Elsevier content. Basically that is a competitor of Mendeley's application platform in the future. And I think if you look at the big success stories on the Web—for example, Skype, for example, Facebook, Google and Apple—one thing they all have in common is they have very, very simple, very appealing user interfaces. And traditionally, I think this is where researchers have very low expectations, because frankly speaking, lots of the interfaces for researchers are terrible. When I was a Ph.D. student, and I had to use the OPAC system of my library, I didn't know how to do it. And I think I'm quite technology-savvy, but I just didn't know how to use those different interface, because they were very complicated.

And even Mendeley, which I think has a relatively easy interface, if you have ever done user testing, you know how much can go wrong. We regularly do user testing where we do screen recordings; we ask people a simple task, like: Can you please add a document to your Mendeley library? Can you now try to create a group? Can you try to share the document with somebody else? And people struggle so much, even an interface as easy as Mendeley, that we always, when we watch those videos, we cringe, we go like: "Oh, god! Oh! I can't watch this. This is so painful." I would urge everyone who's developing interfaces for end users to do user testing, because it is very revealing to how users actually interact with your interface, what goes wrong and how many misunderstandings there are. And I think that's one way that publishers can really add value, that libraries can add value, by providing better user experiences that make it more pleasant and more fun to use research content. And I think Mendeley is somewhat seen as special in this case, because we do all of those things and which is why Werner Vogels, the CTO of Amazon—this is one of my favorite quotes about our company—he said he strongly believes that Mendeley can change the face of science.

And that's the end of my talk. Thank you very much.

【林】　Thank you very much for your passionate and.... It was long, but people are very satisfied. I can see the face of everyone, yeah. Thank you very much.

　　So, let's get into the discussion. Well, if you can speak English, then ask him any question or to debate in English. If you don't speak English, then please speak in Japanese, and I or Miki from the Oxford University Press can translate into English.

　　So, various aspects he provided already, and I think there must be many questions about each phase.

【Question】　Thank you very much for the ... presentation and I enjoyed it very much. And I have one question about the journal's roles and what Mendeley can do. You talked about validation and filtration which Mendeley already have some solution, but the last designation is a bit complicated. And probably it is not simply measuring impacts, but more than that, probably. So, do you have any plan of working directly with publishers?

【Henning】　So, first of all, I agree with the fact that it should be about more than impact. I think ideally what you would want with a tool, not just like Mendeley, but with a tool that does designation, I think you want to go beyond impact, but you want to understand how it has impacted other people. So you want to have some form of provenance of ideas. So it would be very nice to, for example, see that, you know, maybe only five people have read a paper, but those five people took the idea and started a new field that has become very influential. Conversely, it could be that 1,000 people have read one document, but it's something that everybody knows already, so it has very little impact, real impact. So I think it's important to try to not just boil it down to a few numbers that everybody can just compare against, and I think it's almost dangerous to just tie everything to simple numbers. I mean, today, the impact factor is used for purchasing decisions, but also for career decisions—so who gets tenure-track, who gets grant money, which research team gets grant funding. And it's so easy to use these numbers, but they don't really understand what is going on in the background.

　　So, ideally, I think we would want to develop ways that track the flow of ideas, that track how ideas influence people and to make that visible and to do it qualitatively, not just quantitatively.

　　In working with publishers, we actually do have a couple of collaborations with publishers already. They are, at this time, mainly about getting publisher content on the Mendeley platform. So the first companies that we have agreements with are Springer Publishing and IEEE, so the electric engineering society. And they will provide us with their content, and we will make our metadata more complete in the catalog so that we can send more traffic to the publisher and they will also provide us with PDF, so we can

use those PDF previews that I've shown you where you can read the first one or two pages of a document.

Now the publishers that we've spoken to are very interested in usage statistics. They want to learn more about how their content's being used and by whom and where. So we will provide them with statistics about click-through rates and how many people have looked at a paper, how many people have looked at the PDF preview, how many people have added the document to their library. But that's the extent of the collaboration so far, and we haven't really discussed in more detail what we can do with different forms of impact measurement or ideas that go beyond impact measurement.

【Question】 So are you being careful to be neutral among publishers? You know, if publisher gives you much money, then you can manipulate something.

【Henning】 Yeah. It's an important question. So, one thing that happened to Mendeley from the start was, we had a lot of interest from publishers who wanted to invest in the company. So it was—some of the big commercial publishers also have venture capital arms and they wanted to put money into Mendeley, and we felt that that was the wrong thing for us to do. We wanted to remain independent of publishers, because we felt maybe they were not interested in seeing our vision succeed but in trying to get the foot into the door of something that might potentially disrupt their business models. And we've been very open with publishers from the start about what we want to achieve and how we want to do it and we've always been willing to meet them when they said, "We have concerns about the sharing or displaying content in our catalog," when we've always come to those meetings. And we tried to tell them that we try to stay neutral between publishers, because obviously, some, especially commercial publishers, had very intense competition between each other.

And so, sometimes I think that can actually play to our advantage. So, initially, it was very hard to get any publisher to provide us with content, but as soon as Springer was the first one to say, "We are willing to share our content with you," suddenly a lot of other publishers came and said, "Oh, we want to do it, too." So I think for us that's a fortunate position to be in, that we're not dependent on any particular publisher but we have very good relationships with lots of different publishers, both commercial and non-commercial.

【林】 Are there other question?

【Question】 I'm Tanifuji from National Institute of Material Science. I'm a bit confused the definition of readership, or how do you measure the readership of articles? If researchers download through the Mendeley interface from any publishers, like install on their hard disk, and they may store on your cloud server instead? And on the

other hand, you're just saying that you also post or make copy of articles published by publishers on the Mendeley . What's the difference between, or what are they?

【Henning】 Okay. So, our definition of readership is whether somebody has a document in their Mendeley library, either in the desktop or online. We also track whether somebody actually opens a document, if they have a PDF, and whether they actually read it and which parts they read. But we don't share or show that information yet and we don't do anything with it. So, at the moment, readership really only means whether a user has the document in their library.

【Question】 On your server?

【Henning】 Either on the desktop or on our server. So, the copies that we get from publishers, they do not count to readership unless a user adds the document to their library; then it counts to readership.

【Question】 If the researcher's computer underneath the proxy server at the institute, how do you count the number of open document on her or his computer?

【Henning】 Quite simply, in Mendeley desktop itself, so we can track which documents are open at any given time. So, like any movement, like I click now on this, this information is stored in the database, or I've created this highlight, this information will be stored; I've created this annotation, this information will be stored. And we want to use it in the future, for example, to show if you open a document, then we can show you that, for example, this paragraph here has been highlighted by many people. So, Amazon already does this. I don't know if you have a Kindle, but on the Kindle you can actually switch on popular highlights and popular notes. And then you can see which parts have been highlighted by others. So we want to do the same thing here for research papers and we track what people do in their desktop environment.

【Question】 So, in other words, the Mendeley software which are installed on my computer store those information and then communicate with the Mendeley server and then you integrate more information and show that for measurement?

【Henning】 Yes. So that's what happens. And I think what's important there is the question of privacy. So, again, maybe I should tell a little story.

When we started Mendeley, the only way to synchronize information to the website was to drag it into a folder on the left, which was called My Mendeley Web Folder. And very, very few people did it. And we were worried that if nobody shared this information, we couldn't build our vision of aggregating information that would help science. And so we felt, "Okay. What happens if we just synchronize information automatically for everything that's in your Mendeley library when somebody presses 'sync'?" And so we just went ahead and built a feature and waited whether people would start to complain

about this. And in the end, nobody did. And people said, "Oh, this is so much easier. Now everything is synchronized." And actually, today, we're getting complaints that you still have to press the synchronize button to synchronize, because they say, "From Dropbox and Evernote, everything is always sync automatically that I don't have to press 'sync'." So I think people value convenience very much over control, to certain extent.

Now, what we do on the website is, we only show anonymous aggregate information. So you can see, for example, for this document how many readers it has and where they are from, but you cannot see the names of who it is that is reading the document. And that information will always remain private.

【Question】 I think that's very advanced and perhaps very innovated idea, because when I installed this software on my desktop, when I was very enjoying, but when I see the synchronize button, I stopped using it, because I should be careful what information I am synchronizing to, what are the information posted by who. So it wasn't clear, so I didn't. But now I understand it and perhaps as a librarian point of view that is very good study if somebody would be willing to understand how much institution or employees or students use, which of e-resources or journals are used related to if we should keep purchasing, because that's the information we can't get from publishers; they only get total number of ... information in detail, so we don't know who. But if you could do in some way to part of the librarian management, that would be great.

【Henning】 Yeah. Thank you. I think that's exactly what the Swets product will be about, to show librarians the usage of their subscribed resources.

【林】 Before, I just would like to ask you one controversial point. If you promote the Mendeley to the researcher at the private pharmaceutical companies, there are big conflict between his interest to science and for security of the company. How do you solve it?

【Henning】 Yeah. So, we are getting a lot of requests for enterprise licensing, and many of them come from biotech and pharma companies. And it's exactly as you say. Their main concern is privacy, because Mendeley obviously is a open system; it's designed for sharing. And pharma companies and biotech companies are very concerned about a new billion-dollar drug discovery project coming out. So, we actually have a couple of customers and enterprise customers who are biotech companies and who know this and they're using Mendeley as it is and they don't seem to mind this open aspect, but the majority definitely have this concern.

So what they want is—and internally we are calling it a virtual private Mendeley—so what they want is that anything that happens in here stays within the boundaries of the enterprise. So we will next year probably develop a version which,

instead of synching to the Mendeley website, it only synchs with the company's intranet. And so this way, all of the information from the enterprise will be kept separate and heavily encoded.

I don't think we want to go down the route of actually installing software on enterprise servers; we want to do it as a hosted cloud computing solution—so, like, for example, sales force—but most people that we've spoken to seem comfortable with this idea that as long as we can guarantee that it's stalled separately, it's encrypted and we can show the security mechanisms, then that's going to be fine.

【Question】　So, if you use that system, can you actually get out of that system and go no more Mendeley?

【Henning】　That's a good question. We don't know yet. I think many companies will not want to enable that. I think many will probably want to be able to pull information from the outside, from Mendeley, inside their company, but not allow anything to go out, even if it's, you know, because it might happen accidentally or because they don't want people simply to be able to share. But we'll have to see when we develop it.

【Question】　I have two questions. I think one might be quite basic, but what happens to the copyright issue? So the copyrights owned by, say, a publisher. And if you're showing the first two pages, do you show first two pages of all the PDFs, all the 50 million unique documents that are on your website?

【Henning】　I'll answer the second question first. If we have a PDF and we also have an external identifier, like a PubMed ID or a DOI, then, yes, we always show the first one or two pages, unless, of course, the document is only one or two pages long, then we don't show it. But if we have an external identifier, then we simply go ahead and we show the PDF preview. And I think this is one of the cases where I think, as a company, we were willing to take a risk and just, because it's a gray area, and we just went ahead and did it.

And the story behind this is, as you've seen, many of our investors are from the music industry. In the music industry you have the equivalent; you have this 30-second preview track for music. And in the music industry people, after a while, realized that this was actually helping their sales. And our investors from the music industry said—in the beginning, the music industry was so against previews, they just wouldn't allow it, but then somebody just went ahead and did it, and then they showed them that it was beneficial for sales. And then everybody said, "Okay, we'll do it."

So, the recommendation they gave to us was: "Ask for forgiveness rather than for permission, because otherwise it's never going to happen." And so we went ahead and did it. And our statistics show that if we have a PDF preview, then the click-through to

the publisher is about 15-20% higher than if we don't have the PDF preview, so we're helping publishers get more traffic. What's more important, this button here, "Save PDF to library," or "Save reference to library," this is being used 100% more. So if you have a preview, then people are twice as likely to add the document to their library, which means that they are going to be more interested in reading it and possibly purchasing the document and possibly also in citing it. So it helps the publisher's metrics as well.

And I think this is why, after the publishers saw we had done this, they wanted to know: "Okay. What are the effects?" We were able to show this positive effects that they were actually willing to work with us and actually now provide us with more documents so we can do those previews for where we don't have the place.

Now, to your first question, the copyright, I think this is a very, very difficult area, obviously, and lots of gray areas in there. So, generally, I think we've been very careful with public sharing of documents. So, in any of these groups, like this group here, you cannot actually publicly share the PDF; you can only share the reference. But if you click on the document, you can then find the link to the publisher's site or the link to the library resolver to help you retrieve the full text.

So there is not much of a copyright issue with public sharing, but we do allow people to share their own publications on their Mendeley profile here. So, yes, we could integrate with services like SHERPA/RoMEO, but we found that the information in there is very often not reliable. So we simply ask our users to check that they have the right to distribute. And if they don't, then they can hide the PDF here. And also, if the publisher sends us a notice and says, "These are documents that can't be distributed," then we take them down. And so, legally, it's quite simple, that we are protected by the United States DMCA rule that says if you have a robust procedure for taking down content, if the copyright owner complains, then you are safe from any kind of legal trouble.

I think it's more difficult in the context of private groups and sharing. So, in those private groups, like this one here, Mendeley Research, we use this to internally share documents that are relevant for our own research. And so, in these private groups, you can actually share full text documents. And the reason we went ahead and did this was, we felt, first of all, sharing happens anyway in academia; it's a reality that publishers are aware of; people share by email, by Dropbox, by RapidShare, by SharePoint, by Google Docs, by Huddle, by Basecamp; there are so many ways that people can share if they want to that are easier than Mendeley and less restricted than Mendeley. So, Mendeley is actually quite restricted because the number of people you can have in a

group is limited, to 10 people in the free version. Also it's a more controlled environment. So we can get publisher statistics about how many people are sharing and where, and if the publishers then want to know: Does that university have a license for sharing?, they can check.

We also feel that since most of the sharing happens within an institution, most of the people who share have access to the same documents anyway, so there shouldn't be a big restriction in terms of licenses, because if a researcher at Harvard shares a *Nature* paper with somebody else at Harvard, they all have access to that same document. Even if they share with somebody outside, a Harvard researcher sharing a *Nature* paper with somebody at Stanford, Stanford also has a *Nature* subscription, so the publisher doesn't lose any revenue.

And lastly, there is so much stuff that you can legally share, like your own papers, working papers, creative comments papers, open access papers, that we feel it would be wrong to restrict this sharing because there are so much that you can do legally, but there is a legal application for this. And we basically don't want to police and say, "No. You can't do this," because we come from the perspective of end-users. We are researchers and we knew that we just needed ways to share in order to be able to collaborate in the first place, and that's how we basically argue to publishers as well.

【Question】　Thank you. And just one quick one. How many users do you have in, say, Japan or China and East Asia?

【Henning】　So I don't know the specific number. I know that worldwide we have 1.3 million. The biggest part of that is the US and the UK, which together is about 40%. I think for the big European research nations we have about 10%. So it would be, say, 130,000 in Germany, 140,000 maybe in France or Spain. Japan, I think, would be maybe 5%, so that would then be around 60,000, 70,000 people maybe, something on that order. I don't know. I could look it up, but something like that.

【林】　じゃ、最後として。Last question, please.

【Question】　My name is Katsuhisa. I come from Springer and I'm glad that we were the first publisher that...(inaudible).

I have two questions. Correct me if I'm wrong. The first one is that the last part, I was quite threatened that the article on ...(inaudible)... that validation journals provide peer review, but in your perspective, as a researcher, do you think that the Cornell archive will expand in other disciplines besides physics and computer science and mathematics?

The second question is, would you please tell me briefly your business model? You mentioned the free version. And what is the non-free version? I'm curious about....

【Henning】 Okay. So, for your first question, I don't think archives are going to expand, but I think there will be more pre-print repositories, probably, in different fields, or they will be more visible. I think there are already a number of pre-print repositories—like, for example, in economics you have RePEc. There's a start-up in New York called SSRN, Social Science Research Network, which is actually a for-profit company, and they have a lot of pre-prints from social sciences and economics, and they also actually do statistics. And there was a big *New York Times* article about the professor rankings in terms of download stats in SSRN. So I think there will be more pre-print open access repositories. And, yes, to be honest, Mendeley's goal is to integrate with them and make that output more visible. So, you know, I think it's going to be still a long time till the vast majority of content will also be available from pre-print archives.

But my impression is that universities are really making a big push for that. So I think the last big one that made news was Princeton University. So, Princeton basically told its researchers that they could not sign over exclusive copyrights to publishers, that they would only sign agreements with publishers where Princeton would retain the rights to also distribute their research in their own repository. So I think that's going to happen.

I think peer review is definitely necessary. My own research has benefited tremendously from that, but to be completely honest with you, I'm not sure that it needs to be a function of the publishers. I think it could also happen in other parts of the academic community. I don't know where. It might be Mendeley, it might be somewhere else. Mendeley can't and doesn't want to do everything. I think we need to stay focused on one thing, which is helping researchers be more effective and efficient in organization and collaboration. But I believe there are other initiatives in any given field of research right now that aim to change things. So one example that I didn't mention today is called Science Exchange, which is kind of like an eBay for academic experiments. So people can put up, say, if they have free resources in their lab, or if they need somebody to do a specific sequence or a specific experiment, then people can exchange resources and experiments, and that is certainly also changing how people collaborate in the future.

I think that's the best way I can answer your first question.

As for your second question, our business model is primarily about this productivity and collaboration. So we do have free accounts for individuals, but we also have premium accounts for individuals. So we already have a couple of thousand users who have upgraded to Mendeley premium accounts because they need more storage space; if

they want to synchronize their library across multiple devices—like, you know, their home computer and laptop and iPad—or if they need to share information in bigger groups. So if you are the PI of a lab, for example, and you if you need to share with 15 or 20 people, then you can't do it with a free version, but you have to upgrade.

I think in the long run the majority of our revenue is going to come not from individual premium accounts but from institutional premium accounts. So, we already have currently about, I think, 350 inquiries for institutional licensing, both from academic institutions as well as from enterprises. And we, at the moment, have 7 of those paid pilots with institutions and enterprises and we are going to roll out more of them next year. And Swets is going to be our distribution partner for library sales. And that's going to be the main business model for the next, I would say, two years.

Looking beyond that, I think our big vision is building an ecosystem of applications, like the ones that we are starting to see built, like ReaderMeter and Kleenk and Science Counter, where hopefully in two years we have a robust ecosystem where other startups are making money with academic data. And we can then find ways of working with them to either do a revenue-sharing model or selling our own data to them so that they can build new businesses. And I think many publishers have approached us as well about trying to sell content on the Mendeley platform.

So, one of the companies that we have signed an agreement with now is Digruta Publishing, which is a German publishing company, and they have been very keen to explore selling articles through Mendeley to Mendeley users. But I think that's not something that we can do in the next couple of months; that's maybe a year off or longer. But those are the long-term plans we have for business models.

【林】　Okay. I know there are still many questions about that, but we already ran out of our time. So we are now closing our session. And please give him applause to his contribution. Thank you very much.

Now I'm changing my mindset to Japanese.

　ということで、文献管理ツールという切り口から始めましたが、こういう形で、スカラリーコミュニケーションの将来というのが明らかに変わりそうな予感を強く感じていただけたかと思います。ですので、Mendeley とビクターの動きというのはこれからしばらくはあらゆるステークホルダーがチェックする必要があります。何かちょっとスティーブ・ジョブスっぽいところありますよね。顔ではなく、新しいことを始める成り立ちがです。というところで、もしご質問とかがあれば、Mendeley のアカウントをつくっていただいて、お友達になっていただいて質問を投げるとかという形でもできると思います。あとは適宜、皆さんの思うがままにコミュニケーションをとっていただければと思います。

　最後に、動向センター長から一言お願いします。

【センター長】　　Thank you for your good presentation today. As you may not know, our center is science technology foresight center, so we work for depict our future. So today, your presentation is a good opportunity for us to depict our future research image.

　　Individually, I feel this tool will replace some functions(?) of academics or open collaborative research. Thank you very much.

【Henning】　　Thank you very much.（拍手）

【林】　　それではこれで終了いたします。どうもありがとうございました。

<div align="right">―― 了 ――</div>

研究者間コミュニケーションを根本から変える文書管理の変革
Revolution of the reference management tool and its huge potential power to Scholarly Communications

NISTEP Seminar , Dec 08, 2011

林 和弘, Kazuhiro Hayashi (Affiliated Fellow)

Development of scholarly E-journals

- Digitization of information itself
  ↓ Tulip,
- Reviewing on the Web, Distribute through the web
  ↓ Scholar One Manuscript, Science Direct
- Link to other journals, and Bib DB
  ↓ CrossRef, Web of Science, PubMed
- Link to other class of DB
  - Substance DB Gene, Chemical Compound
  - Researchers DB   ORCID
  - Mash-up through API PLoS One

Development of e-Communication
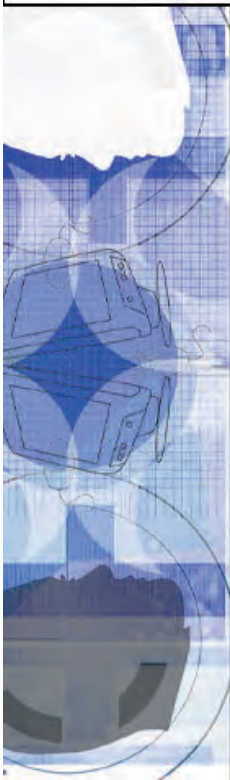
- Before web: Letter, Phone and FAX

  ↓

- After web:

  E-mail (most popular), BBS

  ↓

  Blog , P2P, skype

  ↓

  SNS, twitter

Web media except email is NOT on the main stage of Scholarly Communications (so far).

Change of Storage
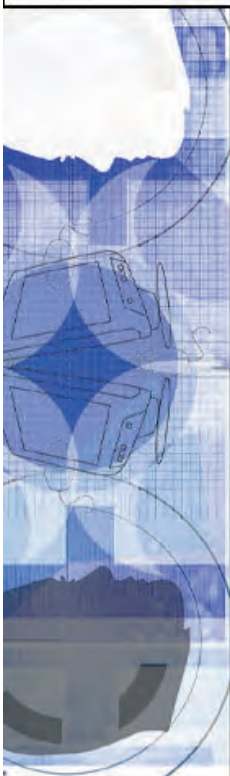
- On the desk, Bookshelf, Library

  ↓

- In PC (Mac), Local folder and External storage (FD, CD, MO and DVD)

  ↓

- HDD and LAN

  ↓

- Cloud

Flood of Information and its management
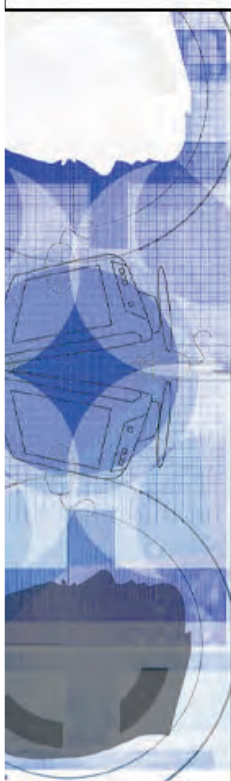
Many papers to read
Many papers to write
Many forms to get budgets
Many forms to be promoted

Management and Sharing of Scholarly Information from a researcher's view
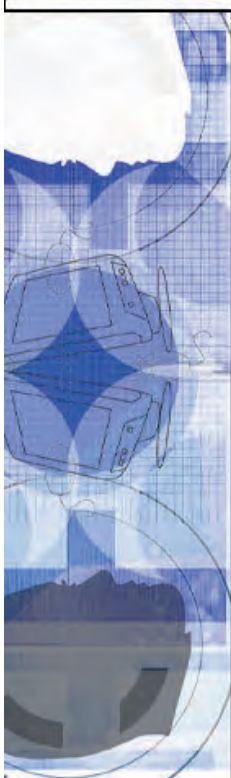
0.0: accumulating in a personal physical space, exchange it by post-mail

1.0: accumulating in a personal local digital space, exchange it by e-mail

2.0: uploading on a personal web space, sharing on the web, communicate by e-mail

3.0: In a cloud, a person reuses each other's data and registers to their personal space sometimes with his evaluation, communicate on SNS

Reference Management Tools
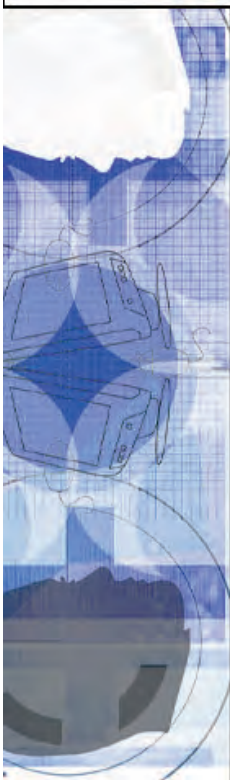
0.0: Binder（Filing）

1.0: EndNote launched: Local , writing support

2.0: RefWorks launched: ASP, sharing

3.0: Mendeley : Born Cloud, sharing, co-creating, co-evaluation

- And 3.0 Others (Read Cube, TogoDocs)
- Earlier tools are improved to 3.0

Now not just for reference managements

Today's Goal
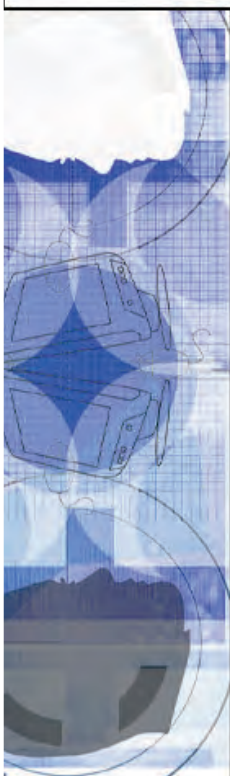
- Learning the latest innovative tool for scholarly communication (not just a reference management tool)
- Learning how it has been developed
- Hearing of a founder's background to learn the origin of innovation
- Prospecting the future of Scholarly Communications using the latest tool

Through **MENDELEY**

Mendeley:

From three guys in a virtual garage to changing the face of science?

Dr. Victor Henning
Co-Founder & CEO
Mendeley

www.mendeley.com

A brief introduction
to Mendeley
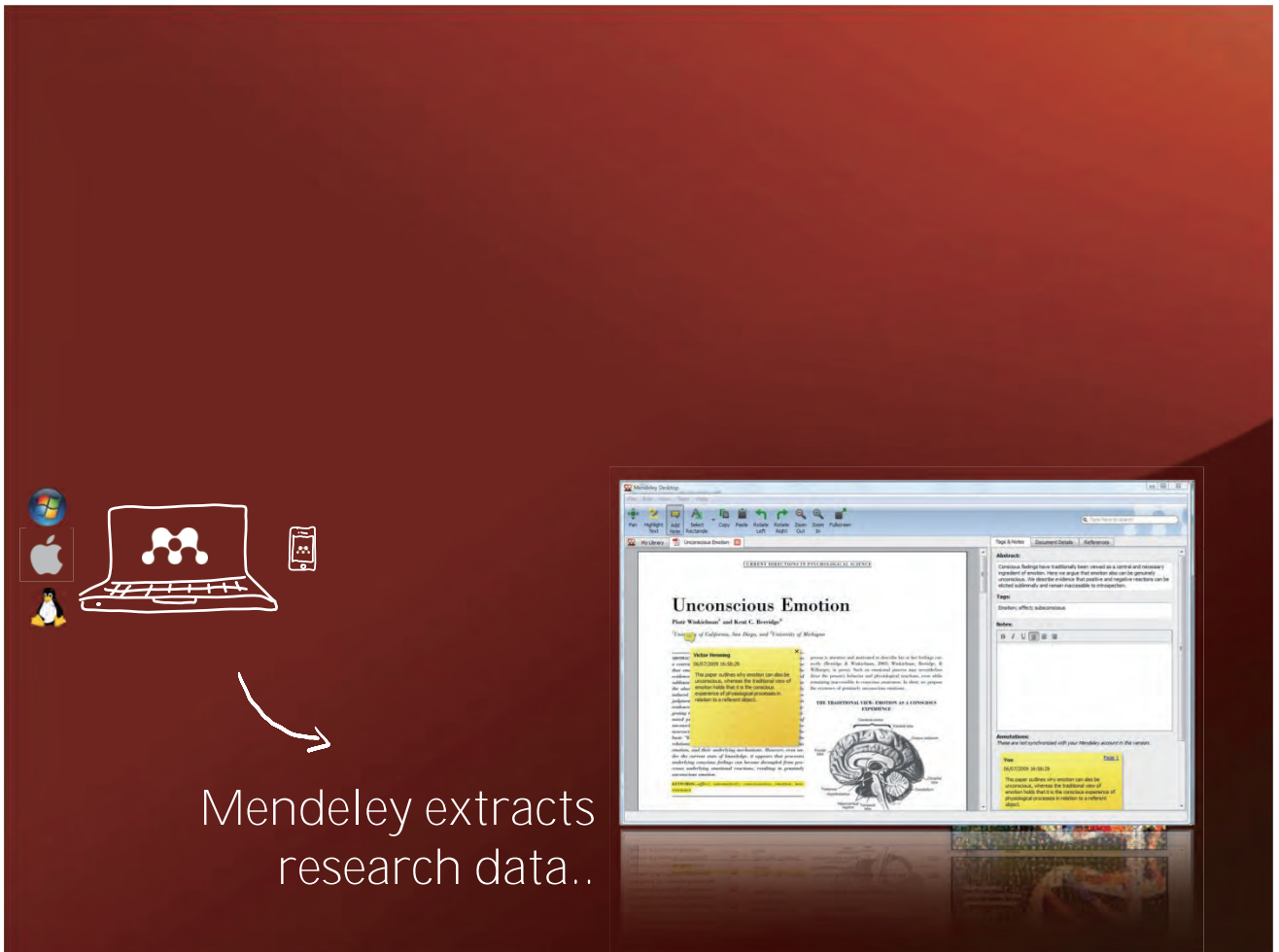
Mendeley extracts
research data..

..and aggregates research data in the cloud
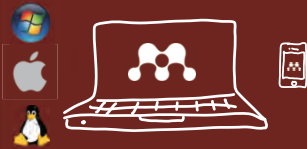
Mendeley extracts research data..

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Dan Harvey added documents to this group
- Overlapping Experiment Infrastructure : Why run experiments ?
- Overlapping Experiment Infrastructure : More , Better , Faster Experimentation Categories and Subject Descriptors

5th April - comment - like

Dan Harvey and Robert Knight like this.

Kris Jack added documents to this group
- Bayesian Online Learning for Multi-label and Multi-variate Performance Measures
- Novel Tools To Streamline the Conference Review Process: Experiences from SIGKDD'09
- TrueSkillTM: A Bayesian skill rating system

28th March - comment - like

Nicolas Esteves has joined this group
24th March - comment - like

Robert Knight added a document to this group
- Bed -Tree : An All-Purpose Index Structure for String Similarity Search Based on Edit Distance Categories and Subject Descriptors

13th February - like

Robert Knight This is the paper that the previously added paper by Behm et. al. spends some time bashing.
13th February

Comment

Robert Knight added a document to this group
- Answering Approximate String Queries on Large Data Sets Using External Memory

13th February - like

Robert Knight This paper uses q-gram inverted indexes for approximate searches in the 10M-entry database of MedLine titles - possibly of interest in relation to https://office.mendeley.internal/trac/wiki/DataminingSearchBasedTitleLookup.
13th February

Robert Knight There is a related web-page with Academic-BSD licensed code at http://flamingo.ics.uci.edu/
13th February

James Hammerton Thanks for this, I'll have a look at it in due

66 new messages

Recommended articles

Based on the contents of your Library, Mendeley recommends:

Neural correlates of behavioral preference for culturally familiar drinks. ✕
Samuel M McClure, Jian Li, Damon Tomlin, Kim S Cypert, Latané M Montague, P Read Montague in Neuron (2004)

Save reference to library — 92 readers

Incorporating contextual information in recommender systems using a multidimensional approach ✕
Gediminas Adomavicius, Ramesh Sankaranarayanan, Shahana Sen, Alexander Tuzhilin in ACM Transactions on Information Systems (2005)

Save reference to library — 65 readers

Constructive Consumer Choice Processes ✕
James R Bettman, Mary Frances Luce, John W Payne in Journal of Consumer Research (1998)

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Neural correlates of behavioral preference for culturally familiar drinks.

by Samuel M McClure, Jian Li, Damon Tomlin, Kim S Cypert, Latané M Montague, P Read Montague

Psychology › Miscellaneous Papers

Overview
References 44
Related research

Neuron (2004)
Volume: 44, **Issue:** 2, **Publisher:** Elsevier, **Pages:** 379-387

PubMed ID: 15473974

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Abstract

Coca-Cola (Coke) and Pepsi are nearly identical in chemical composition, yet humans routinely display strong subjective preferences for one or the other. This simple observation raises the important question of how cultural messages combine with content to shape our perceptions; even to the point of modifying behavioral preferences for a primary reward like a sugared drink. We delivered Coke and Pepsi to human subjects in behavioral taste tests and also in passive experiments carried out during functional magnetic resonance imaging (fMRI). Two conditions were examined: (1) anonymous delivery of Coke and Pepsi and (2) brand-cued delivery of Coke and Pepsi. For the anonymous task, we report a consistent neural response in the ventromedial prefrontal cortex that correlated with subjects' behavioral preferences for these beverages. In the brand-cued experiment, brand knowledge for one of the drinks had a dramatic influence on expressed behavioral preferences and on the measured brain responses.

Related research

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M Beverland in European Journal of Marketing (2004)

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Brand Love: Brand Image and Loyalty in Australian Elite Sport
Sarah Broadbent, Kerrie Bridson, Lesley Ferkins, Ruth Rentschler in Australian and New Zealand Marketing Academy (2010)

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Luxusguetermarketing unter Spezieller Beruecksichtigung der

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Groups

Memory systems

Tags

brand · neuroscience

Page 1

Neuron, Vol. 44, 379–387, October 14, 2004, Copyright ©2004 by Cell Press

Neural Correlates of Behavioral Preference for Culturally Familiar Drinks

Samuel M. McClure,[1,2] Jian Li,[1] Damon Tomlin,
Kim S. Cypert, Latané M. Montague,
and P. Read Montague*
Department of Neuroscience
Menninger Department of Psychiatry
  and Behavioral Sciences
Baylor College of Medicine
1 Baylor Plaza
Houston, Texas 77030

Summary

Coca-Cola® (Coke®) and Pepsi® are nearly identical in chemical composition, yet humans routinely display strong subjective preferences for one or the other. This simple observation raises the important question of how cultural messages combine with content to shape our perceptions; even to the point of modifying behavioral preferences for a primary reward like a sugared drink. We delivered Coke and Pepsi to human subjects in behavioral taste tests and also in passive experiments carried out during functional magnetic resonance imaging (fMRI). Two conditions were examined: (1) anonymous delivery of Coke and Pepsi and (2) brand-cued delivery of Coke and Pepsi. For the anonymous task, we report a consistent neural response in the ventromedial prefrontal cortex that correlated with subjects' behavioral preferences for these beverages. In the brand-cued experiment, brand knowledge for one of the drinks had a dramatic influence on expressed behavioral preferences and on the measured brain responses.

Introduction

Perceptual constructs are generally multidimensional, integrating multiple physical and cognitive dimensions to generate coherent behavioral preferences. In sensory processing, the idea of multidimensional integration has long been used to frame a range of questions about cross-modal interactions in physiological and behavioral responses (Stein et al., 1996; 1999; Wallace and Stein, 1997; Armony and Dolan, 2001; Dolan et al., 2001; Laurienti et al., 2002, 2003). This same multidimensional perspective has also been developed for olfactory and gustatory processing, where the detection, discrimination, and perceived intensity of stimuli are not only functions of the primary physical properties (odors, flavors) but are also modulated "cross-modally" by visual input (Gottfried and Dolan, 2003), auditory input, and current

neural responses, and the modulation of both by nonodor or nonflavor stimuli—that is, the sensory problem. Ultimately, such sensory discriminations and the variables that influence them serve to influence expressed behavioral preferences. Hence, there is another large piece of the problem to understand. For modern humans, behavioral preferences for food and beverages are potentially modulated by an enormous number of sensory variables, hedonic states, expectations, semantic priming, and social context. This assertion can be illustrated with a quote from Anderson and Sobel (2003) profiling the work of Small et al. (2003) on taste intensity and pleasantness processing:

> "A salad of perfectly grilled woodsy-flavored calamari paired with subtly bitter pale green leaves of curly endive and succulent petals of tomato flesh in a deep, rich balsamic dressing. Delicate slices of pan-roasted duck breast saturated with an assertive, tart-sweet tamarind-infused marinade."

The text goes on further, but note that the sheer lushness of the description adds somehow to the appeal of the food described. Also notice one implicit point of the description: many levels of social, cognitive, and cultural influences combine to produce behavioral preferences for food and drink. The above description likely would not appeal to a strict vegan or an owner of a pet duck. Anderson and Sobel point out that the preferences indexed by their prose originated from the economic demands on our early forebears and were unlikely to have been strictly about aesthetic responses to food and drink.

However, the modern problem is different. Cultural influences on our behavioral preferences for food and drink are now intertwined with the biological expediency that shaped the early version of the underlying preference mechanisms. In many cases, cultural influences dominate what we eat and drink. Behavioral evidence suggests that cultural messages can insinuate themselves into the decision-making processes that yield preferences for one consumable or another. Consequently, the appeal or repulsion of culturally relevant sights, sounds, and their associated memories all contribute to the modern construction of food and drink preferences. The neural substrates underlying food and drink preferences and their influence by cultural images have not been explored. As alluded to above, the majority of work on olfaction and gustation has focused on sensory processing. In this paper, we combine simple taste tests and event-related functional magnetic resonance imaging (fMRI) to probe the neural responses that

---

Neural correlates of behavioral preference for cultural

by Samuel M McClure, Jian Li

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Felix Blank *(2005)*
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Observations: Understanding the World of International Luxury Brands: The "Dream Formula"
Bernard Dubois, Claire Paternault in *Journal of Advertising Research (1995)*
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11% United Kingdom

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motivation
This tag has been used on: **10,048** papers   **1** group

Mendeley › tag: motivation

Tag summary

Motivation is the driving force by which we achieve our goals, and is said to be intrinsic or extrinsic. The term is generally used to describe human behavior, but can refer to the causes of animal behavior as well. According to various theories, motivation may be rooted in a basic need to minimize physical pain and maximize pleasure, or it may include specific needs such as eating and resting, or a desired object, goal, state of being, ideal, or it may be attributed to less-apparent reasons such as altruism, selfishness, morality, or avoiding mortality. The most well-known theories of motivation include Maslow's hierarchy of needs, Herzberg's Motivation-Hygiene theory, Alderfer's ERG theory, Deci and Ryan's self-determination theory, and Vroom's expectancy theory.

Edit description

Related tags
achievement   motor skills   emotion
discrimination learning   group processes
thematic apperception test   hypnosis
reaction time   anxiety   problem solving

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Persuasive Technology
In this group we gather information about the field of persuasive technology (aka. captology), and discuss our findings. The term 'captology' was...

behavior   behavioral science   captology   hci   motivation   persuasive technology

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Popular papers

How to build a motivated research group.
Uri Alon in *Molecular Cell (2010)*

Motivated group members experience a full sense of choice: of doing what one wants. Such behavior shows high performance, is enjoyable, and enhances innovation. This essay describes principles of building a motivated research group.

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Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being.
R M Ryan, E L Deci in *American Psychologist (2000)*

Human beings can be proactive and engaged or, alternatively, passive and alienated, largely as a function of the social conditions in which they develop and function. Accordingly, research guided by self-determination theory has focused on the....

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A Theory of Human Motivation
A H Maslow in *Psychological Review (1943)*

This paper develops a theory of social norms: what they are, how they form, and how they change. The theory also makes predictions about group formation, categorization, and discrimination, and it can be extended to model leadership and fairness....

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Persuasive Technology

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Group newsfeed

kristina Curtis
❝ is anyone familiar with the work of Jakob Nielsen? How does he compare to BJ Fogg? Apparently we should not be put off by the website..
24th May

kristina Curtis has joined this group
24th May

Frank Mathmann is now following this group
13th May

Kevin Smith has joined this group
11th May

Robert Vann is now following this group
2nd May

Earl F Spangler III has joined this group
22nd April

Tomoaki Sano is now following this group
15th April

Ciarán Mc Mahon added a document to this group
Hobbes - Leviathan.pdf
11th April

Ciarán Mc Mahon has joined this group
5th April

Ray Sullivan is now following this group
1st April

Lisa Lahr is now following this group
12th March

Lennart Olsen

About this group

CAPTOLOGY

In this group we gather information about the field of persuasive technology (aka. captology), and discuss our findings. The term 'captology' was coined by BJ Fogg, and the field is well described in his article "Persuasive computers: perspectives and research directions," Proceedings of the SIGCHI conference on Human factors in computing systems - CHI '98, 1998, pp. 225-232. The majority of the articles should be from the HCI perspective.

Owned by **Lennart Olsen**
Computer and Information Science

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👤 13 followers

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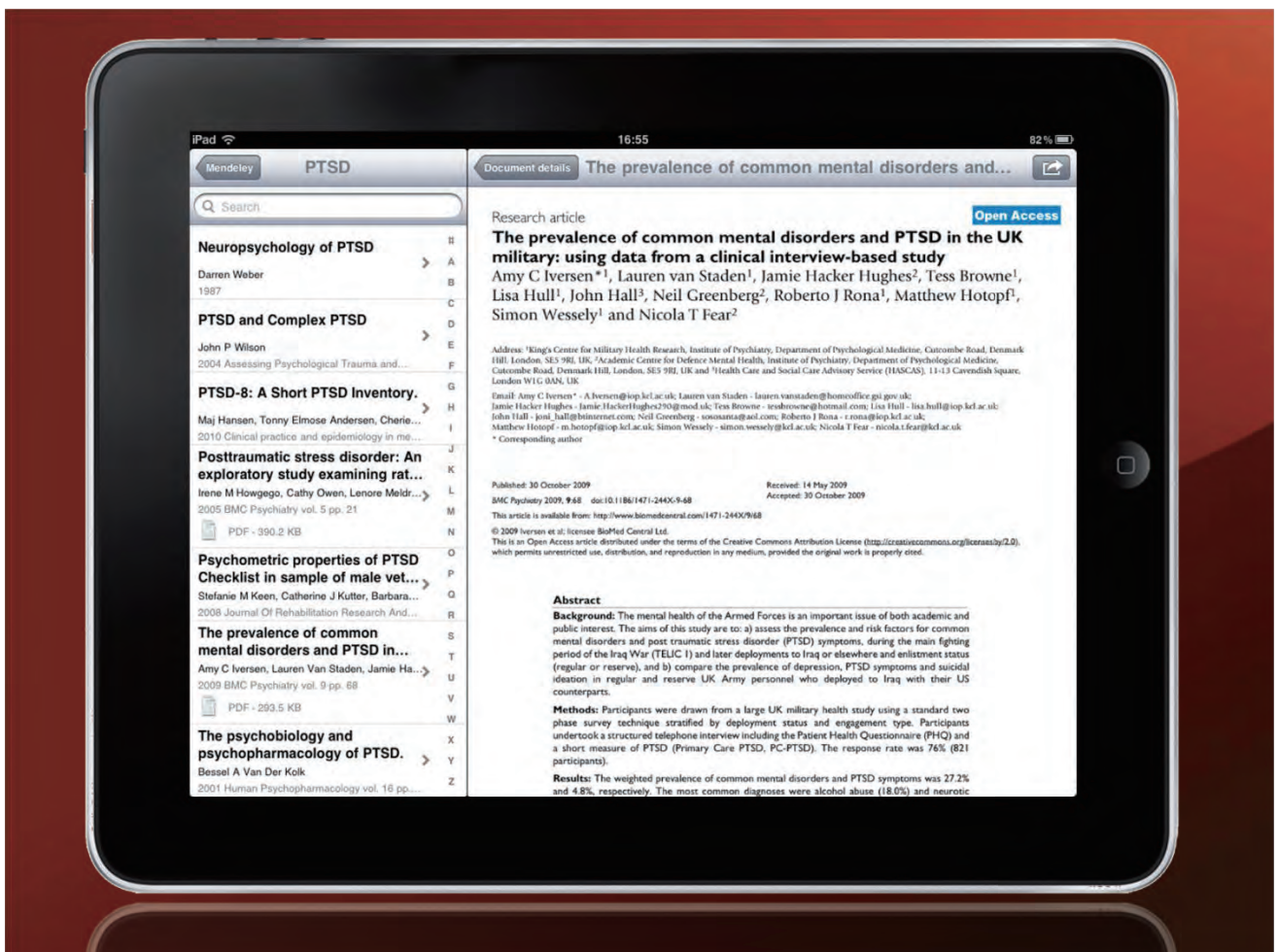
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"Great app! Indispensable for academic works!"
Federico Viola

"As an academic with a terrible memory for names and dates, I expect having access to my mendeley database in my pocket will be a real lifesaver!"

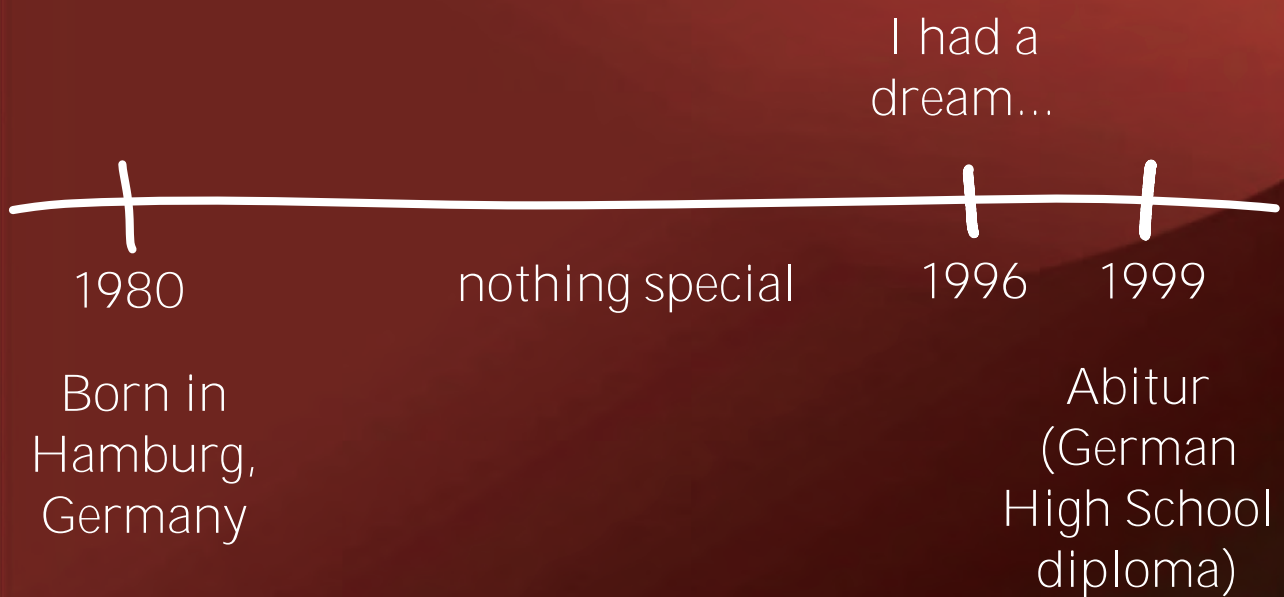Stefan Berteau

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Authors   Tags

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But how did it all start?

I had a
dream…

1980   nothing special   1996   1999

Born in
Hamburg,
Germany

Abitur
(German
High School
diploma)

2000   2001   2002   2003   2004

Sony Music

REVELATION RECORDS

HELKON

OLIVER WYMAN

Bauhaus-Universität Weimar

$2004\frac{3}{4}$ 2005   2006   2007   2008   2009

KOROVA

guru*talk
DIE FILMINDUSTRIE IM
21. JAHRHUNDERT
florian henckel von
donnersmarck
29. juni

GURU.
TALK.

Thorsten Hennig-Thurau
Victor Henning (Hg.)

DIE DEUTSCHE
FILM-
INDUSTRIE
IM
21.
JAHR-
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MENDELEY

ricardo

$257m

last·fm
the social music revolution

$280 m

Dr. Stefan Glänzer

Fig. 1: Pennyless Ph.D. Students

Fig. 2: Michael Palin in The Life of Brian (Raibu obu Buraian)

Fig. 3: Michael Palin as The Spanish Inquisition
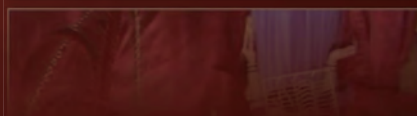
Fig. 4: Covent Garden, London

Fig. 5: Michael Palin's Production Office

*Launch of
Mendeley Invitation-Only
Alpha, 2nd April 2008, 1.10am*
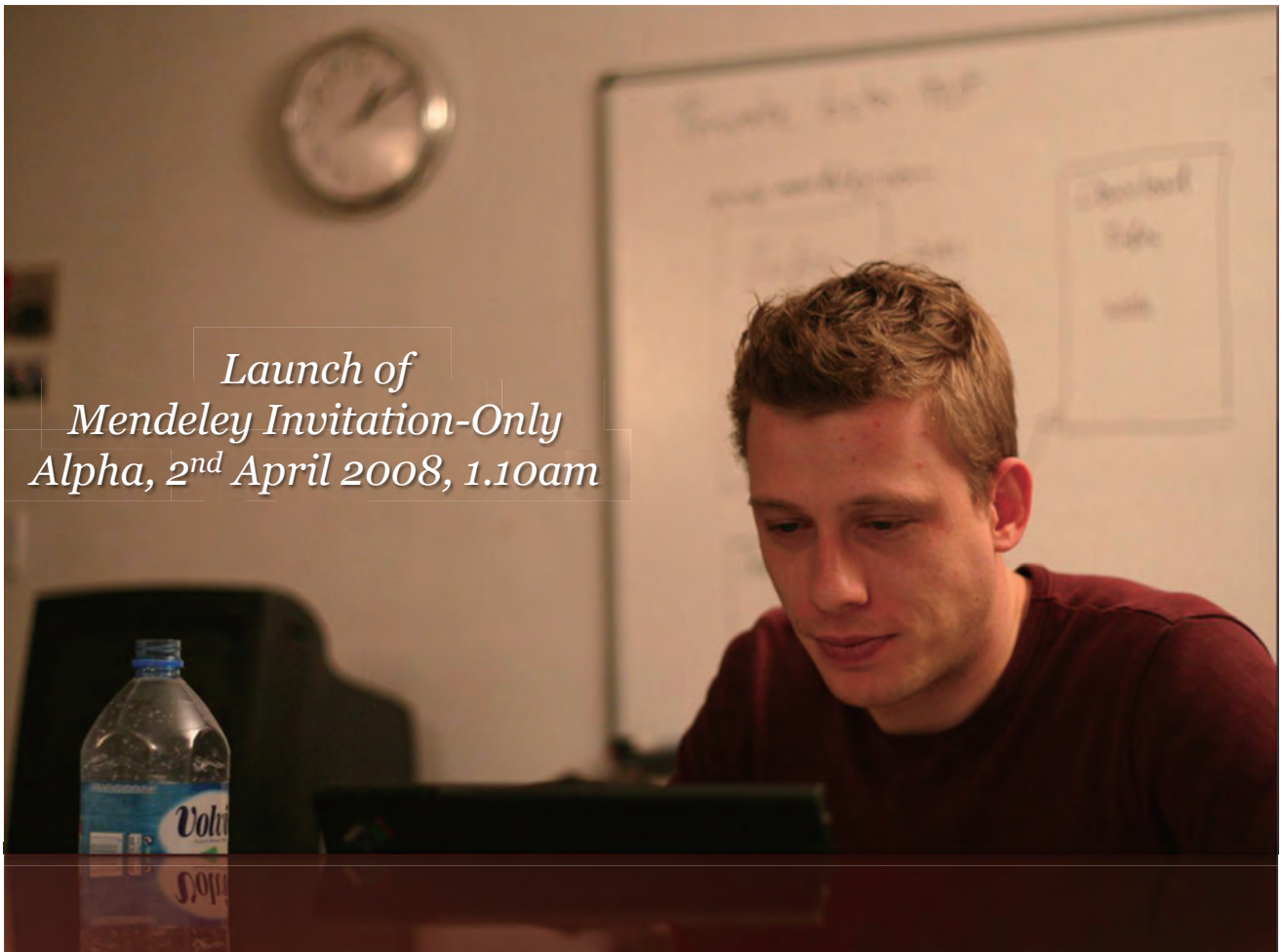
Panic and/or Insanity

Despair
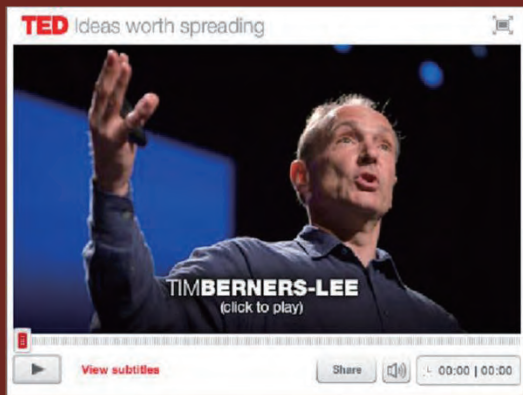
"All the time we are very conscious of the huge challenges that human society has now — curing cancer, understanding the brain for Alzheimer's.

But a lot of the state of knowledge of the human race is sitting in the scientists' computers, and is currently not shared. We need to get it unlocked so we can tackle those huge problems."

Christmas Party 2008

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...now they're deranged and on the loose...
...it's crunch time!

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WHU
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...funded by
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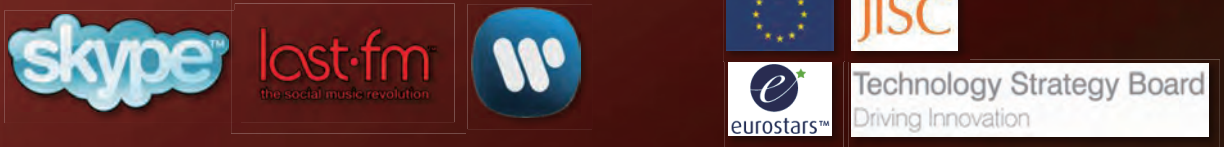
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last·fm
the social music revolution

JISC

eurostars

Technology Strategy Board
Driving Innovation

– 56 –

Launching a joint product
for libraries in January 2012
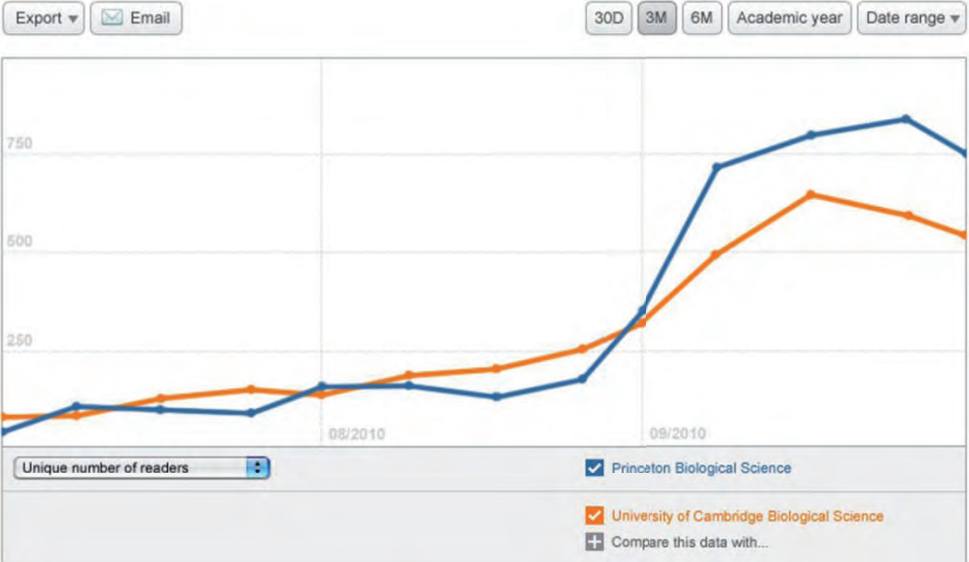
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MIT
Stanford University
Imperial College London
University of Michigan
University of Oxford
Harvard University
University College London
Cornell University
University of Washington
Columbia University
Sao Paulo University
University of California at Berkeley
University of Toronto
University of Edinburgh

Network of 850
"Mendeley Advisors" on
campuses around the world:

The world's largest research database with 130 million user-uploaded documents:
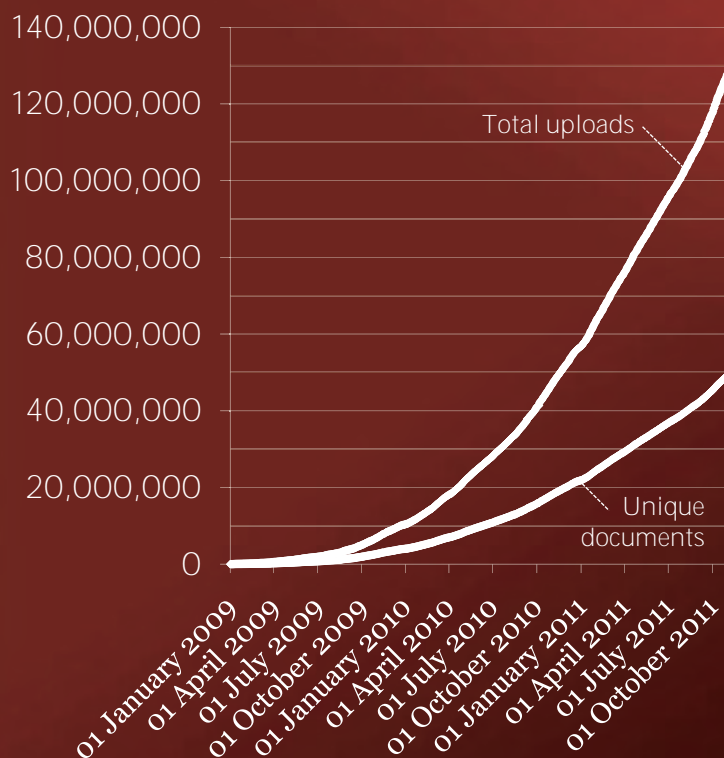
For comparison:

40m: Thomson Reuters *Web of Knowledge*; Elsevier *SciVerse / Scopus*

The world's largest research database with 130 million user-uploaded documents:
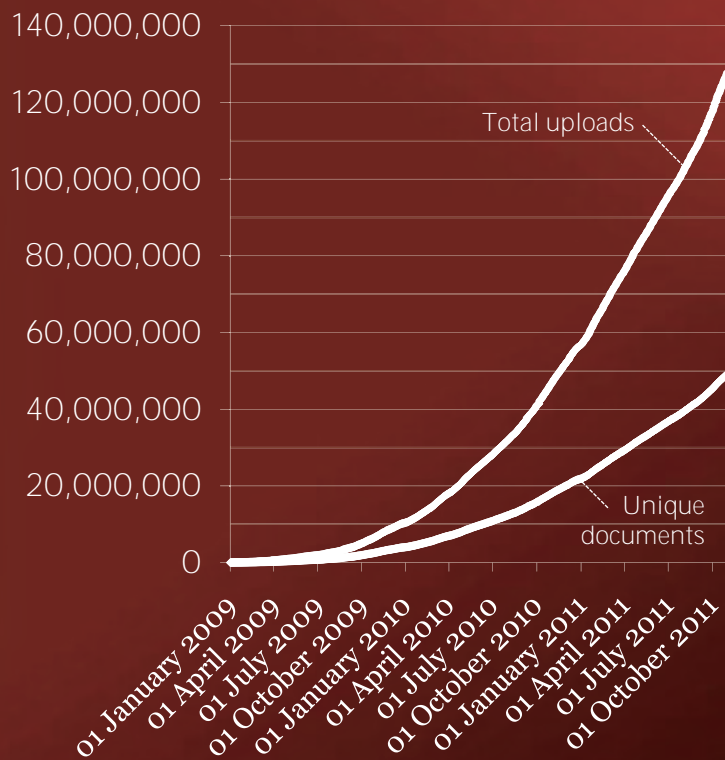
- Documents
- Interdisciplinary user demographics
- User-generated tags
- Related research recommendations
- Real-time reading stats

---

http://dev.mendeley.com

Mendeley Open API

- Documents
- Interdisciplinary user demographics
- User-generated tags
- Related research recommendations
- Real-time reading stats

JISC DURA Project   http://jisc-dura.blogspot.com

Direct User Repository Access

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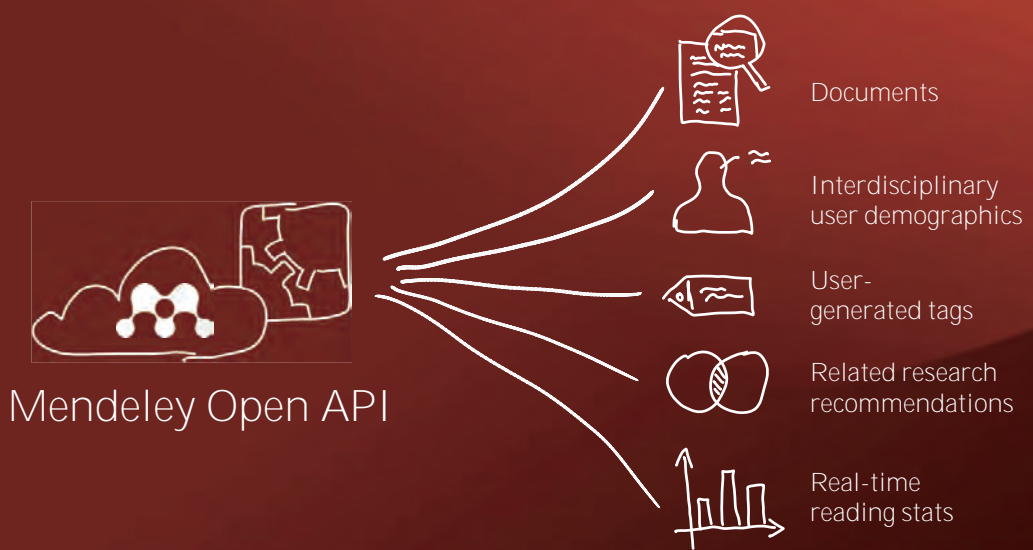
Mendeley/PLoS Binary Battle

Mendeley Open API

PLoS API

$10,001 for the best app

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$1,000 for the best mashup

amazon web services

Tim O'Reilly

Werner Vogels

James Powell

John Wilbanks

Juan Enriquez

DUNCAN J WATTS

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G_R-Index: **31**

Most read publication: **183**

Total number of publications: **90**

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Publication	Readers
Watts and Strogatz (1998)	183
Watts and Strogatz (1998)	62
Kossinets and Watts (2006)	49
Dodds et al. (2003)	48
Salganik et al. (2006)	48
Watts (2004)	47
Kossinets and Watts (2006)	41
De Choudhury et al. (2010)	41
Watts (1999)	38
Watts (2002)	38
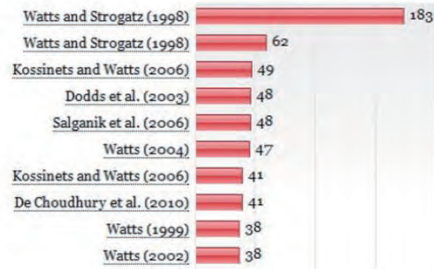
[show all]

Duncan J Watts's coauthors

Luis A N AMARAL Albert-Laszlo BARABASI Munmun De CHOUDHURY FrÃ©dÃ©ric DALSACE Coralie DAMAY Munmun DE CHOUDHURY Ap DIJKSTERHUIS Peter S DODDS Peter Sheridan DODDS Peter DODDS David DUBOIS Robert G ECCLES Karen FRASER Rashi GLAZER Sharad GOEL Nobuyuki HANAKI Steve HASKER Jake M HOFMAN Yoshito HORI Harry HUTSON Yoko ISHIKURA Gueorgi KOSSINETS G KOSSINETS Phillip LONGMAN R Dean MALMGREN Michael C MANKINS Winter A MASON Winter MASON Daniel C MEDINA Roby MUHAMAD M E J NEWMAN Mark NEWMAN Mark E J NEWMAN David M PENNOCK Barbara PERRY Alexander PETERHANSL Daniel M REEVES Economic RESEARCH Charles F SABEL Matthew J SALGANIK Michael SCHRAGE Linda STONE Steven H STROGATZ Steven H. STROGATZ S H STROGATZ Siddharth SURI Eric VON HIPPEL Liv WATSON Geoffrey B WEST Mike WILLIS

Duncan J Watts's alternate spellings

Duncan J. WATTS

Search

DUNCAN J WATTS

183 Collective dynamics of 'small-world' networks.

Duncan J WATTS Steven H STROGATZ

Nature (393) Nature Publishing Group, 1998

PMID: 9623998   ISBN: 9780691113579   DOI: 10.1038/30918

Networks of coupled dynamical systems have been used to model biological oscillators, Josephson junction arrays, excitable media, neural networks, spatial games, genetic control networks and many other self-organizing systems. Ordinarily, the connection topology is assumed to be either completely regular or completely random. But many biological, technological and social networks lie somewhere between these two extremes. Here we explore simple models of networks that can be tuned through this middle ground: regular networks 'rewired' to introduce increasing amounts of disorder. We find that these systems can be highly clustered, like regular lattices, yet have small characteristic path lengths, like random graphs. We call them 'small-world' networks, by analogy with the small-world phenomenon (popularly known as six degrees of separation). The neural network of the worm Caenorhabditis elegans, the power grid of the western United States, and the collaboration graph of film actors are shown to be small-world networks. Models of dynamical systems with small-world coupling display enhanced signal-propagation speed, computational power, and synchronizability. In particular, infectious diseases spread more easily in small-world networks than in regular lattices.

% of readers by discipline   % of readers by location

% of readers by status
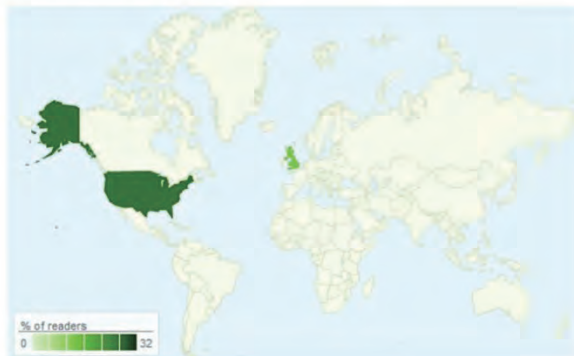
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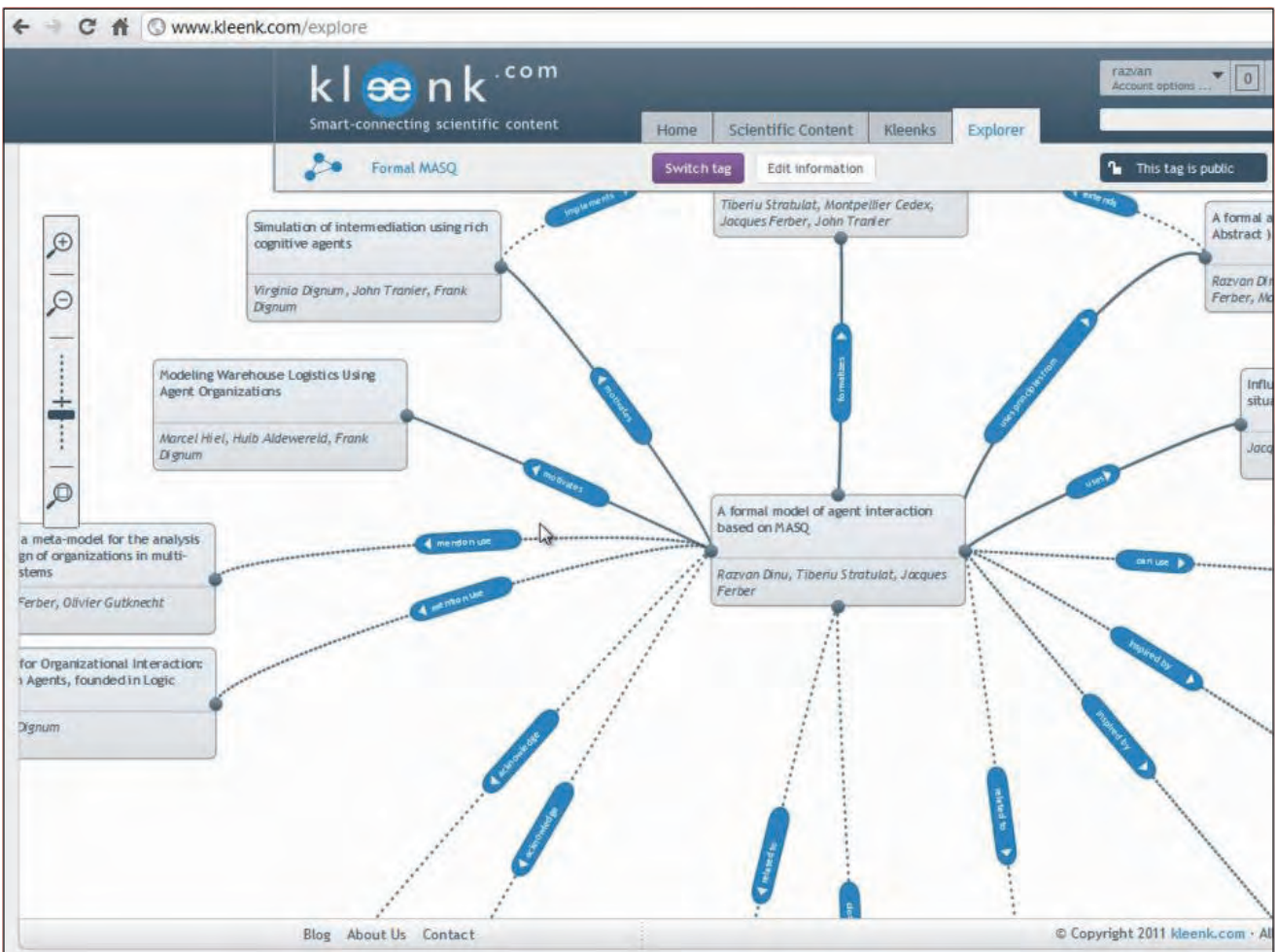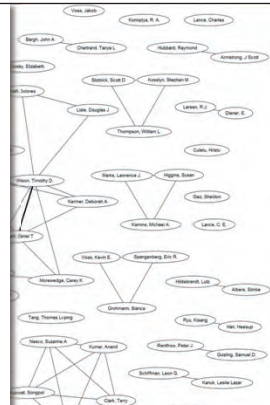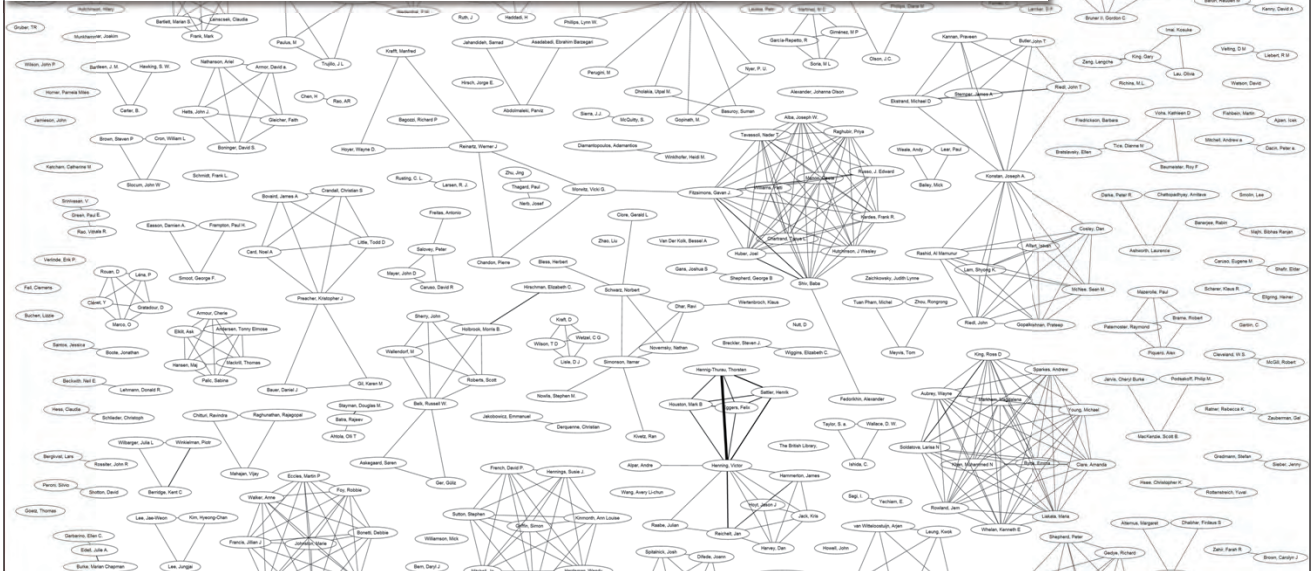
Measuring the evolutionary rate of protein-protein interaction.

by *Wenfeng Qian, Xionglei He, Edwin Chan, Huailiang Xu, Jianzhi Zhang*
published in Proceedings of the National Academy of Sciences of the United States of America (Volume: 108, Issue: 21, Pages: 8725-8730) in 2011

Abstract

Despite our extensive knowledge about the rate of protein sequence evolution for thousands of genes in hundreds of species, the corresponding rate of protein function evolution is virtually unknown, especially at the genomic scale. This lack of knowledge is primarily because of the huge diversity in protein function and the consequent difficulty in gauging and comparing rates of protein function evolution. Nevertheless, most proteins function through interacting with other proteins, and protein-protein interaction (PPI) can be tested by standard assays. Thus, the rate of protein function evolution may be measured by the rate of PPI evolution. Here, we experimentally examine 87 potential interactions between Kluyveromyces waltii proteins, whose one to one orthologs in the related budding yeast Saccharomyces cerevisiae have been reported to interact. Combining our results with available data from other eukaryotes, we estimate that the evolutionary rate of protein interaction is (2.6 1.6) 10(-10) per PPI per year, which is three orders of magnitude lower than the rate of protein sequence evolution measured by the number of amino acid substitutions per protein per year. The extremely slow evolution of protein molecular function may account for the remarkable conservation of life at molecular and cellular levels and allow for studying the mechanistic basis of human disease in much simpler organisms.

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Reviews

should have discussed a whole genome duplication

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by Giovanni Dall'Olio · 8 hours ago · Recommended: Yes · Difficulty level: Intermediate · Reviewer expertise: Intermediate

This paper provides an estimate of the rate of protein-protein interaction gain or loss between two species, S.cerevisiae and K.waltii.

The problem is that the authors did not discuss the fact that a genome-duplication event occurred between the separation of these two species. This may invalidate their conclusions about the overall PPI loss/gain rate of 2.6 1.6) 10(-10) per PPI per year. As the paper is written, a reader unaware of this genome-wide duplication would be inclined to think that this rate can be compared to other species.

Apart from this point, I liked the paper and I think it is a very good experiment. The authors did an impressive job in experimentally verifying all the interactions, and their results are valid for these two species.

References ★★★★☆ *Originality* ★★★★★ *Argumentation* ★★★☆☆ *Readability* ★★★★☆

Mentions

RT @dalloliogm: my first publication review at @PaperCritic http://t.co/Gqfv93MG , about a paper on PPI evolution rate
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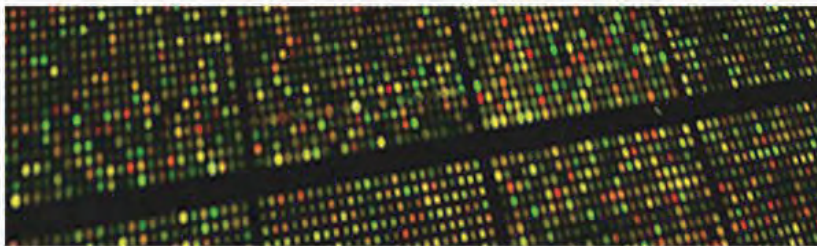
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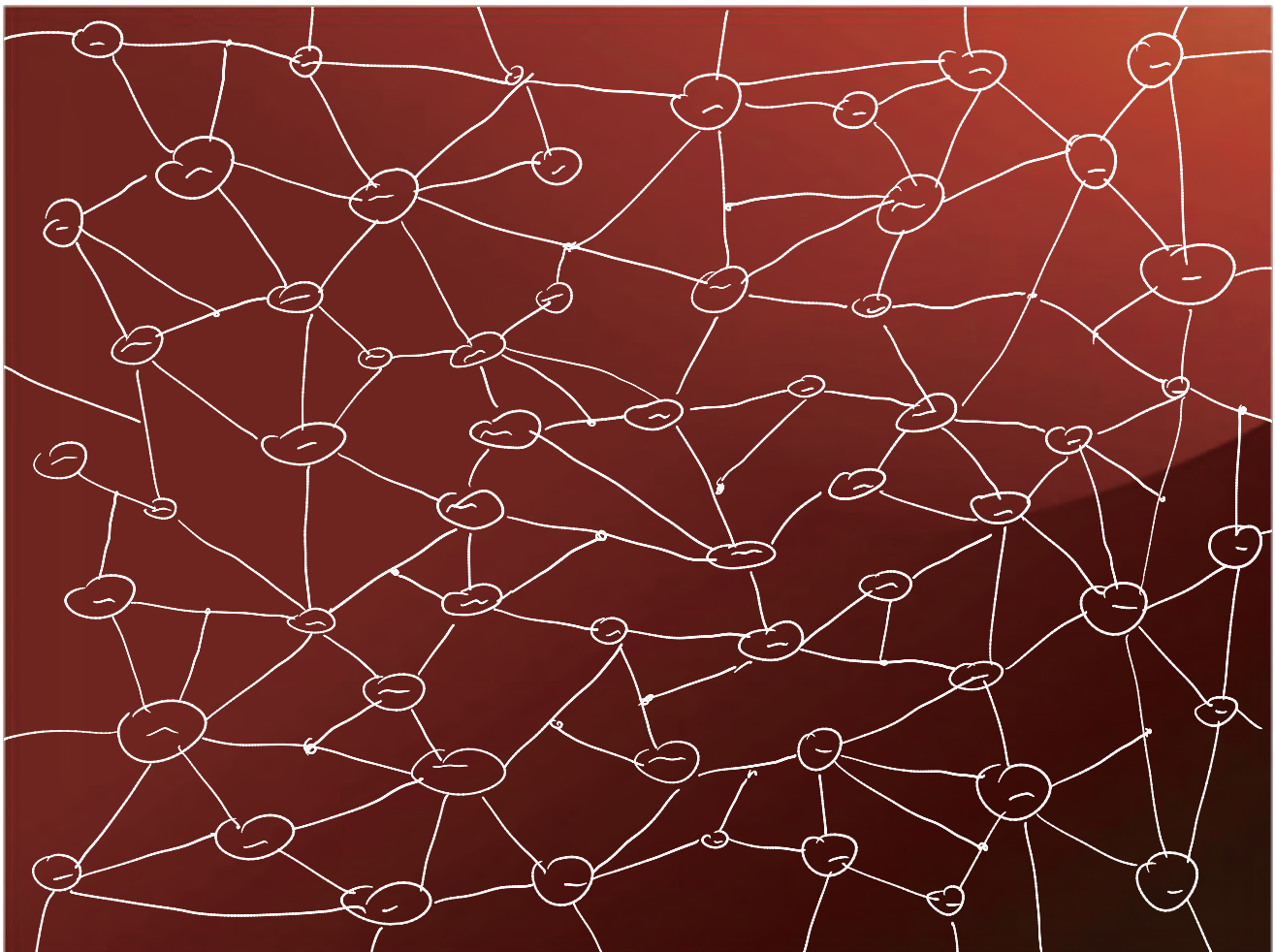
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– 65 –
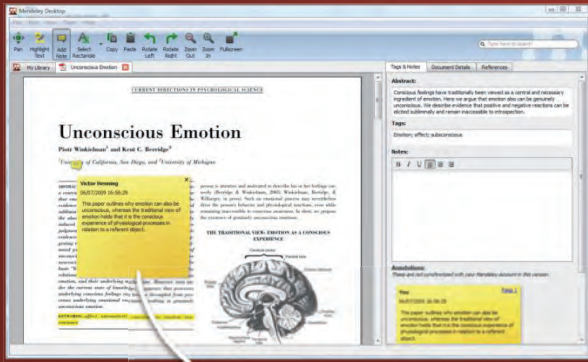
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complements
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Mendeley is crowdsourcing semantic annotations to become the "global brain of science".

What does it mean for the future of scholarly communication?

Academic publishing faces two major challenges:
The "Serials Crisis" and Open Access

The "Serials Crisis": Journal subscription costs
keep increasing, library budgets are shrinking
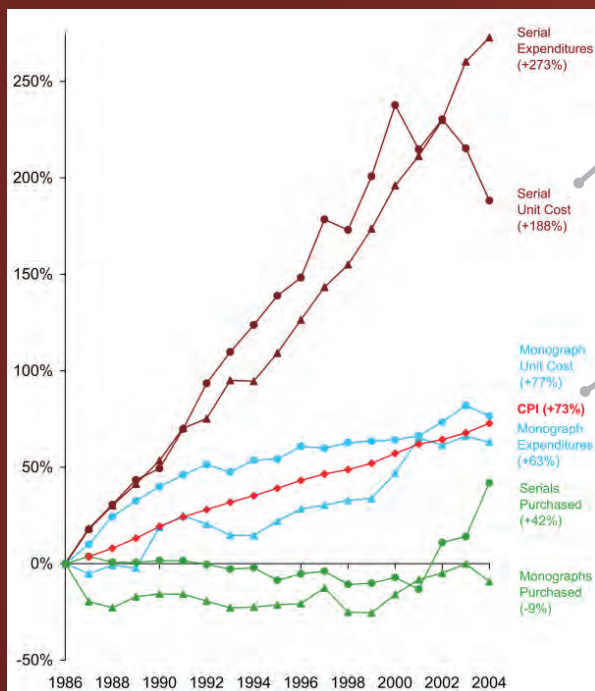
Journal subscription costs

Consumer price index

Open Access: Calls for free public access to (state-funded) academic research

Published online 7 April 2010 | *Nature* **464**, 822-823 (2010) | doi:10.1038/464822a

News

US seeks to make science free for all

Moves to make research funded by the US government available to everyone could mark a turning point in a publishing revolution. Declan Butler reports.

Declan Butler

The push to open up scientific knowledge to all looks set to go into overdrive. Over the past decade, the accessibility offered by the Internet has transformed science publishing. Several efforts have already tried to harness the web's power to make research papers available for free. Now two

Harvard University is part of a group seeking ways to bolster open access to research papers.

M. FEIN/BLOOMBERG/GETTY IMAGES

Jan 4, 2010

Why Hasn't Scientific Publishing Been Disrupted Already?

Posted by Michael Clarke under Business Models, Peer Review,

1. Validation: Journals provide peer review
2. Filtration: Journals facilitate content discovery
3. Designation: Journals provide prestige

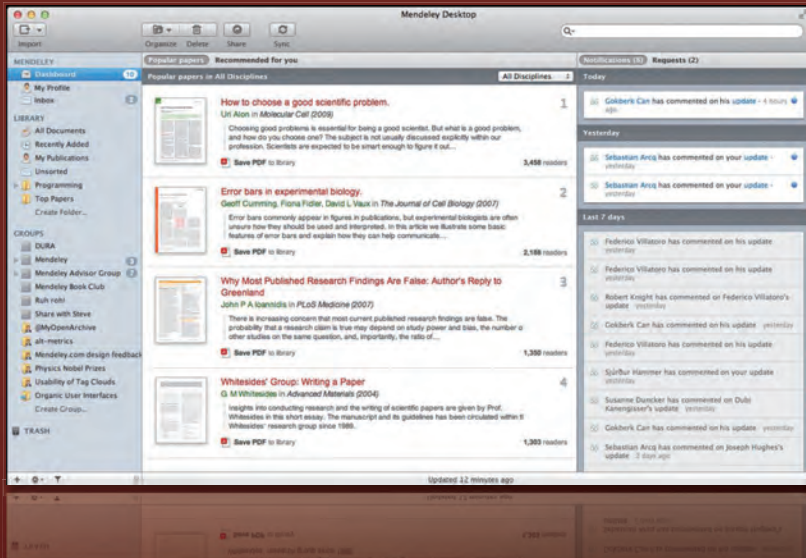# 1. Validation: Journals provide peer review

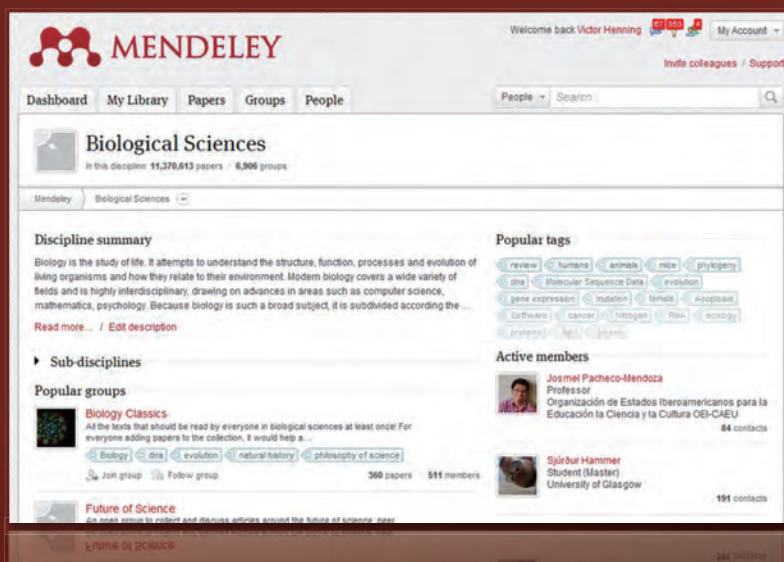# 2. Filtration: Journals facilitate content discovery

Discovery through recommendation algorithms

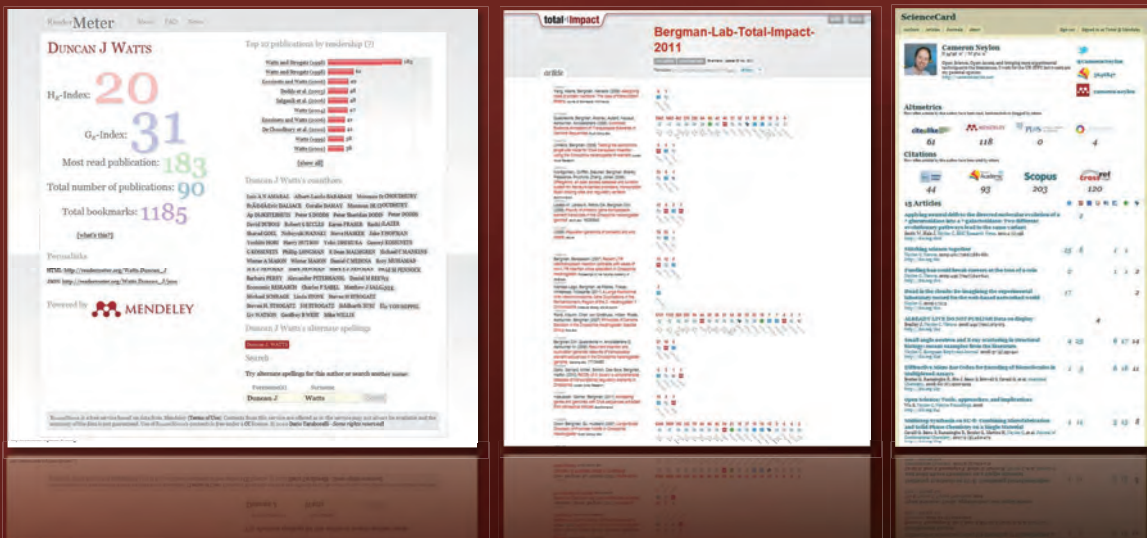## 2. Filtration: Journals facilitate content discovery

Discovery through recommendation algorithms

2. Filtration: Journals facilitate content discovery

Discovery through more than 100,000 hand-curated bibliography lists and groups

3. Designation: Journals provide prestige

With library budgets decreasing, open access mandates expanding, and validation, filtration, designation being offered by "outsiders", what might publishers do?

Establish new B2C distribution channels

Enhance content with additional services/ superior user experience

Establish new B2C distribution channels

Via web, desktop software, mobile devices

Pay-per-download, rental, limited/unlimited subscription, rev-share bundled with other services

Additional data, stats, analysis; discovery and workflow tools; personalization

More appealing UIs, convenience, cross-platform accessibility

Enhance content with additional services/ superior user experience

Dr. Werner Vogels,
CTO Amazon.com

I strongly believe that Mendeley can change the face of science http://bit.ly /lLhf6 (f @mendeley_com)

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