Aries EM User Group Meeting – Jan 15 2016

Dr John Hammersley, Co-founder and CEO

3,000,000 documents

300,000 authors

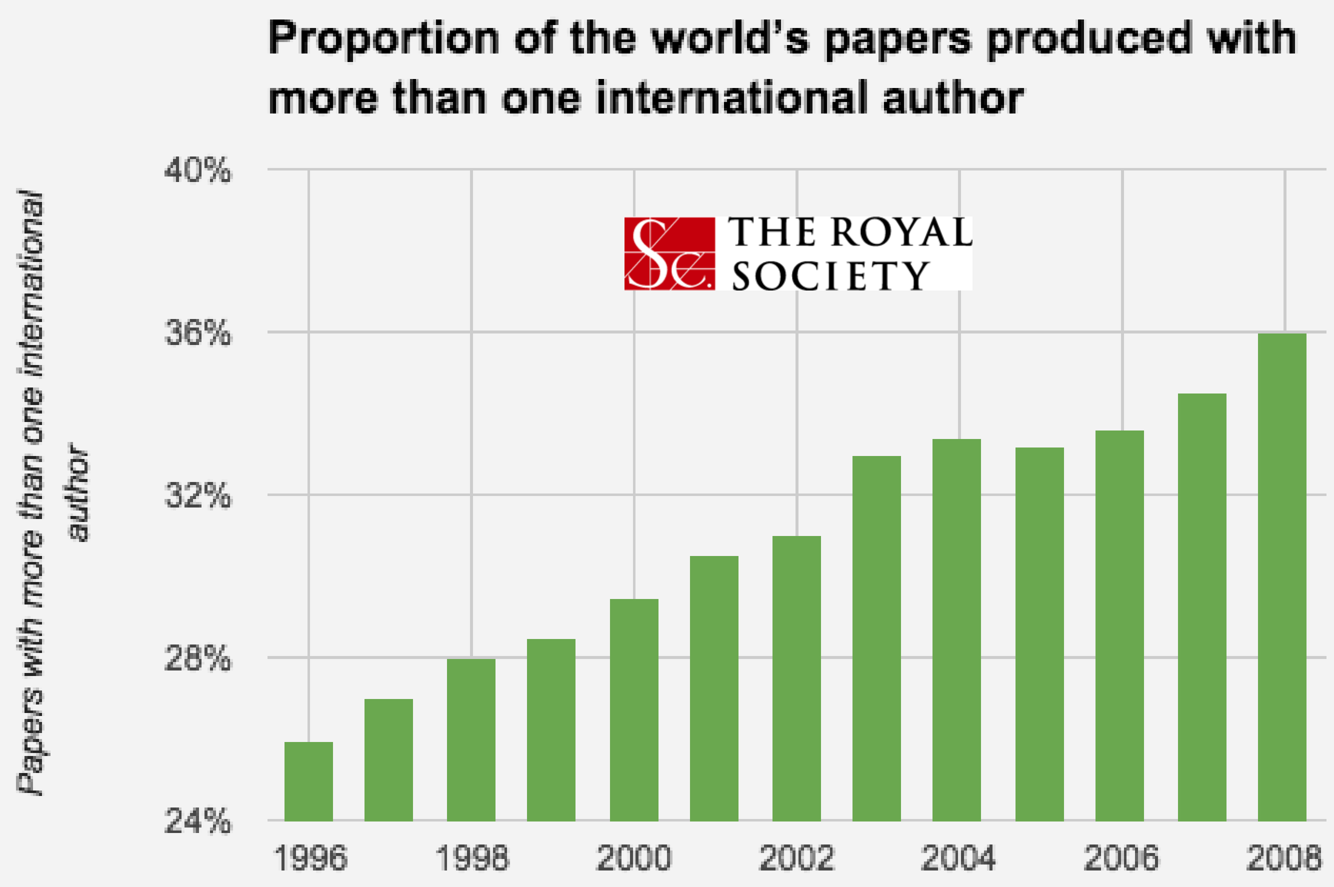
2,000 institutions

in 3 years

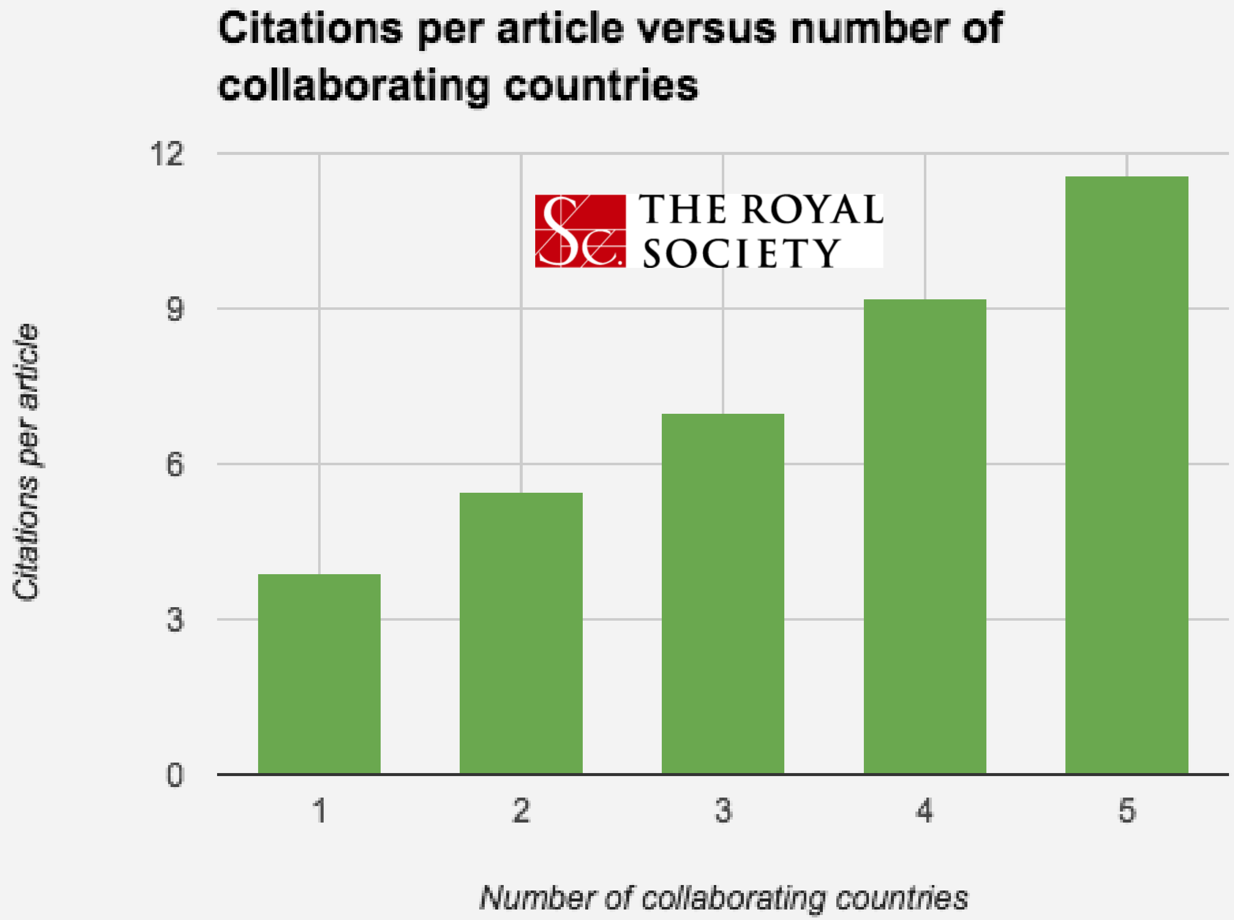
writeLaTeX

Overleaf

The internet is transforming research and collaboration



Source: Knowledge, networks and nations. Global scientific collaboration in the 21st century - The Royal Society - 2011



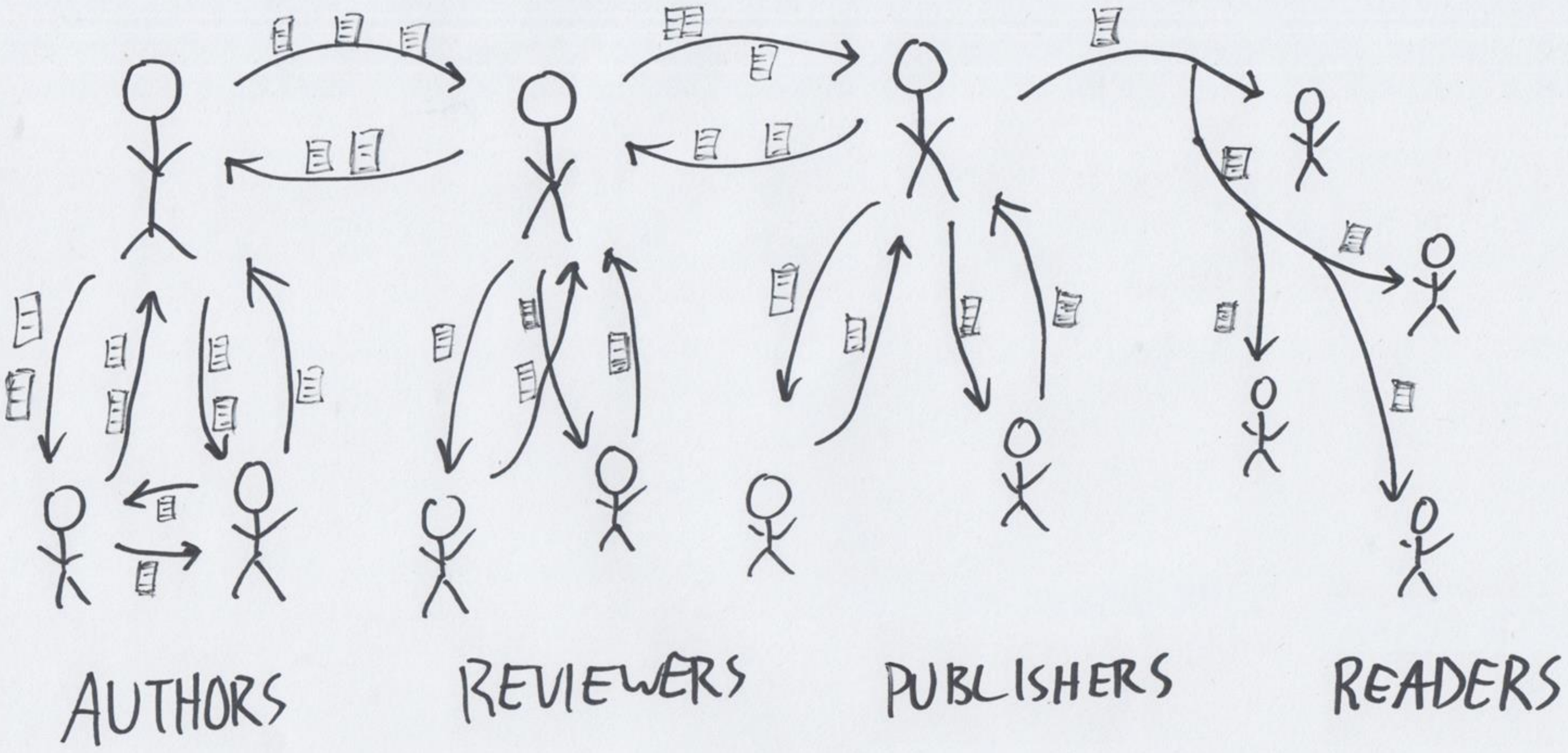
Source: Knowledge, networks and nations. Global scientific collaboration in the 21st century - The Royal Society - 2011

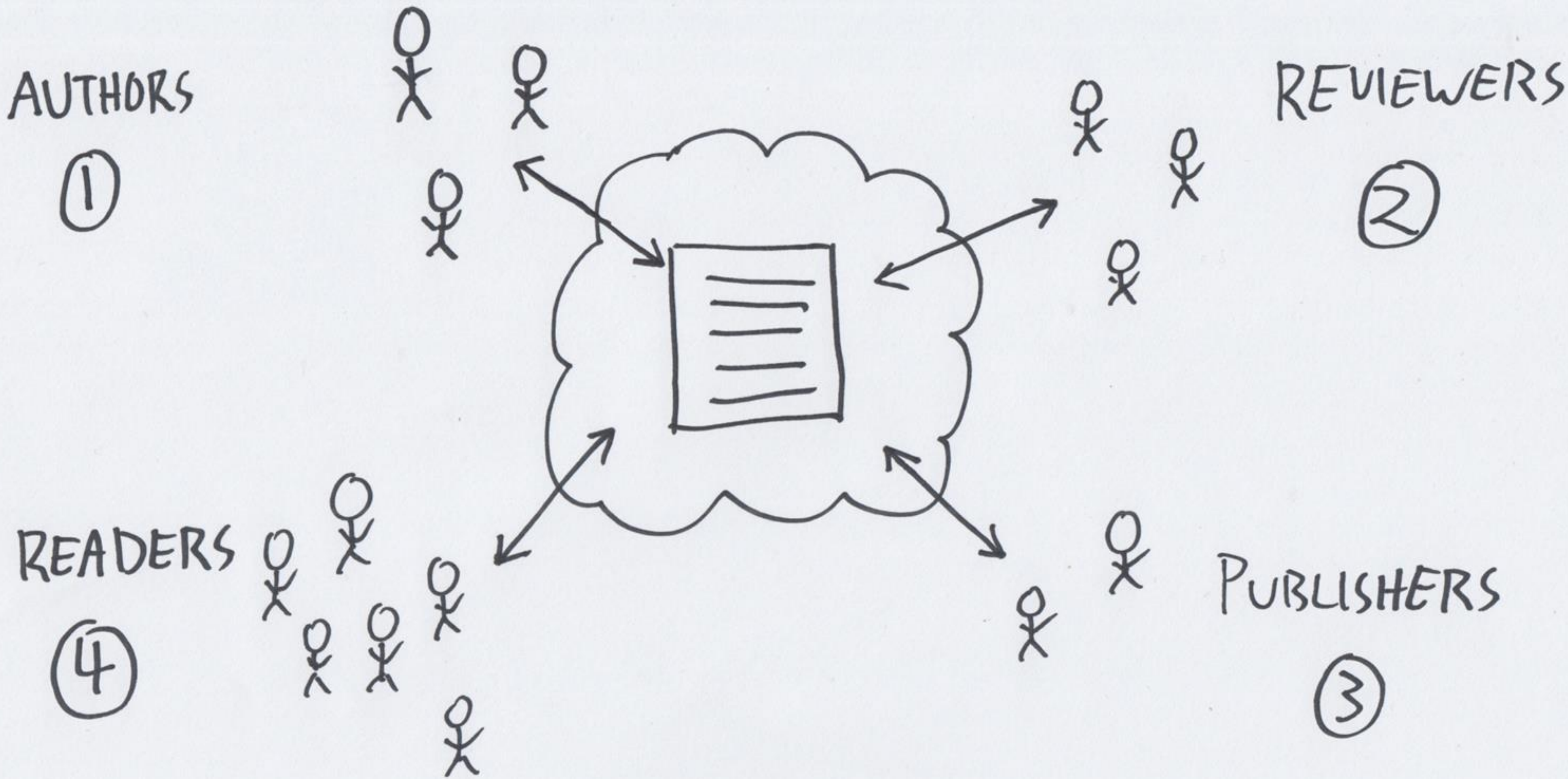
But, collaboration is…

…frustrating!

Endless problems

- Multiple versions of the same document
- Long email chains
- Formatting & typesetting
- Maintaining references
- Long revision cycles


AUTHORS
REVIEWERS
PUBLISHERS
READERS

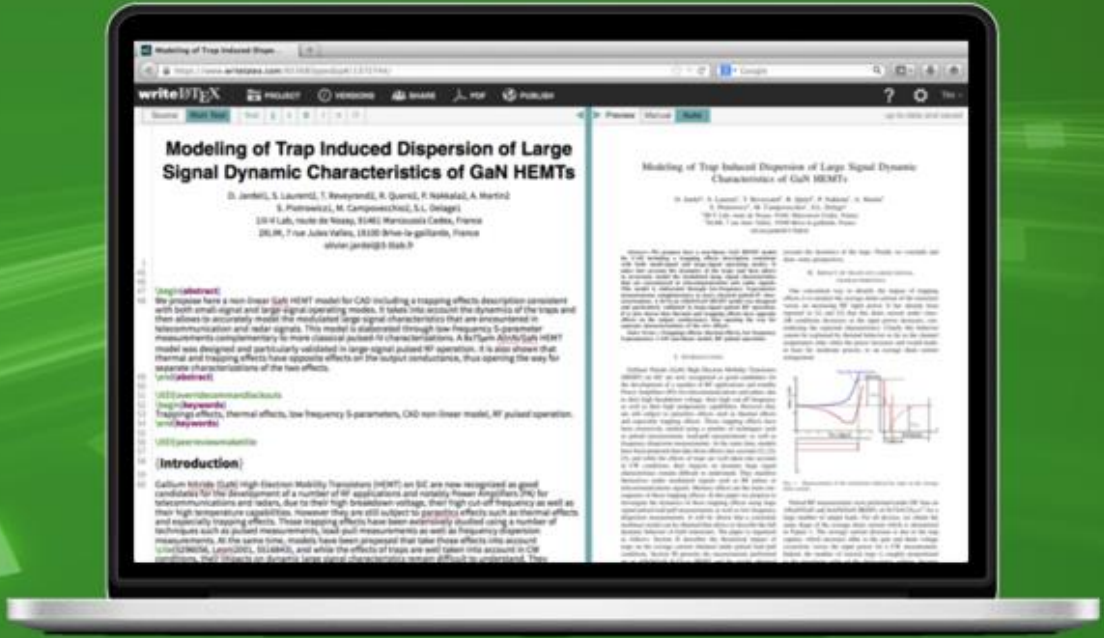

AUTHORS
1
REVIEWERS
2
PUBLISHERS
3
READERS
4

Overleaf

FEATURES & BENEFITS TEMPLATES PRICING COMPANY HELP

Collaborative Writing and Publishing

The easiest way to create, edit and publish your research.



Start writing now! **CREATE A NEW PAPER**

Overleaf PROJECT VERSIONS SHARE PDF PUBLISH ? John Lees-Miller

Source | Rich Text | Edit | Find | § | § | B | I | π | Π

Preview | Manual | Auto | up-to-date and saved

Modeling of Trap Induced Dispersion of Large Signal Dynamic Characteristics of GaN HEMTs

O. Jardel1, S. Laurent2, T. Reveyrand2, R. Quere2, P. Nakkala2, A. Martin2
S. Piotrowicz1, M. Campovecchio2, S.L. Delage1
1III-V Lab, route de Nozay, 91461 Marcoussis Cedex, France
2XLIM, 7 rue Jules Valles, 19100 Brive-la-gaillarde, France
olivier.jardel@3-5lab.fr

Abstract

We propose here a non-linear GaN HEMT model for CAD including a trapping effects description consistent with both small-signal and large-signal operating modes. It takes into account the dynamics of the traps and then allows to accurately model the modulated large signal characteristics that are encountered in telecommunication and radar signals. This model is elaborated through low-frequency S-parameter measurements complementary to more classical pulsed-IV characterizations. A 8x75μm AlInN/GaN HEMT model was designed and particularly validated in large-signal pulsed RF operation. It is also shown that thermal and trapping effects have opposite effects on the output conductance, thus opening the way for separate characterizations of the two effects.

Modeling of Trap Induced Dispersion of Large Signal Dynamic Characteristics of GaN HEMTs

O. Jardel*, S. Laurent†, T. Reveyrand†, R. Quéré†, P. Nakkala†, A. Martin†
S. Piotrowicz*, M. Campovecchio†, S.L. Delage*
*III-V Lab, route de Nozay, 91461 Marcoussis Cedex, France
†XLIM, 7 rue Jules Valles, 19100 Brive-la-gaillarde, France
olivier.jardel@3-5lab.fr

***Abstract*—We propose here a non-linear GaN HEMT model for CAD including a trapping effects description consistent with both small-signal and large-signal operating modes. It takes into account the dynamics of the traps and then allows to accurately model the modulated large signal characteristics that are encountered in telecommunication and radar signals. This model is elaborated through low-frequency S-parameter measurements complementary to more classical pulsed-IV characterizations. A 8x75μm AlInN/GaN HEMT model was designed and particularly validated in large-signal pulsed RF operation. It is also shown that thermal and trapping effects have opposite effects on the output conductance, thus opening the way for separate characterizations of the two effects.**

***Index Terms*—Trappings effects, thermal effects, low frequency S-parameters, CAD non-linear model, RF pulsed operation.**

I. Introduction

Gallium Nitride (GaN) High Electron Mobility Transistors (HEMT) on SiC are now recognized as good candidates for the development of a number of RF applications and notably Power Amplifiers (PA) for telecommunications and radars, due to their high breakdown voltage, their high cut-off frequency as well as their high temperature capabilities. However they are still subject to parasitics effects such as thermal effects and especially trapping effects. Those trapping effects have been extensively studied using a number of techniques such as pulsed measurements, load-pull measurements as well as frequency dispersion measurements. At the same time, models have been proposed that take those effects into account [1], [2], [3], and while the effects of traps are well taken into account in CW conditions, their impacts on dynamic large signal characteristics remain difficult to understand. They manifest themselves under modulated signals such as RF pulses or telecommunications signals. Memory effects are the main consequence of those trapping effects. In this paper we propose to investigate the dynamics of those trapping effects using large account the dynamics of the traps. Finally we conclude and draw some perspectives.

II. Impact of Traps on Large Signal Characteristics

One convenient way to identify the impact of trapping effects is to monitor the average drain current of the transistor versus an increasing RF input power. It has already been reported in [1] and [3] that this drain current under class-AB conditions decreases as the input power increases, contradicting the expected characteristics. Clearly this behavior cannot be explained by thermal behavior as far as the channel temperature sinks when the power increases and would leads, at least for moderate powers, to an average drain current enlargement.

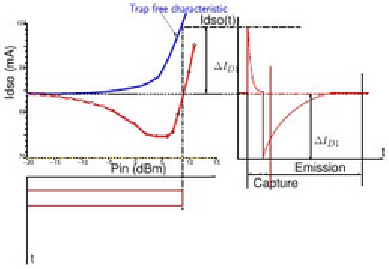
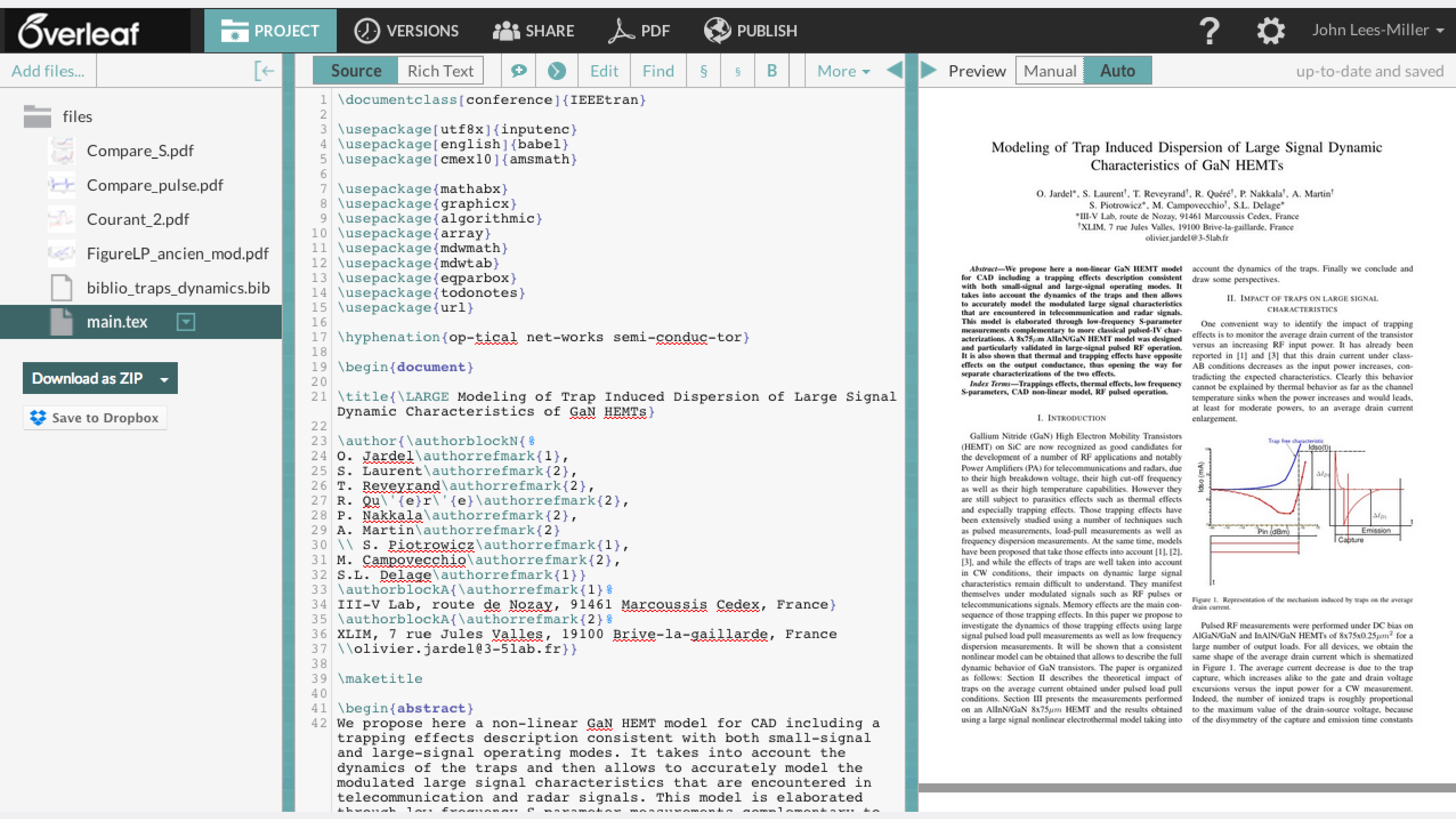
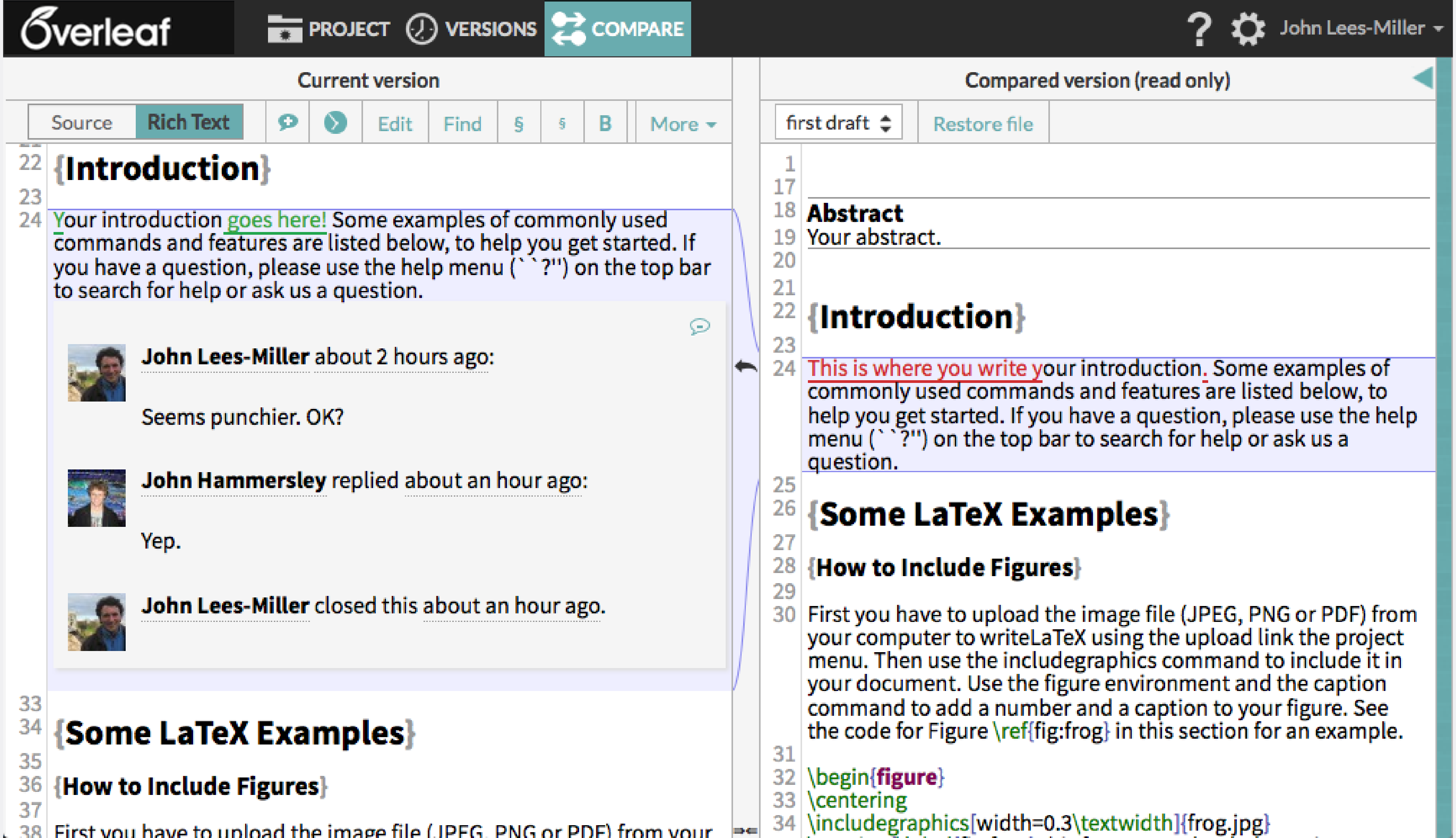


Fig. 1. Representation of the mechanism induced by traps on the average drain current.

Pulsed RF measurements were performed under DC bias on



Overleaf
PROJECT
VERSIONS
SHARE
PDF
PUBLISH
John Lees-Miller
Add files...
files
Compare_S.pdf
Compare_pulse.pdf
Courant_2.pdf
FigureLP_ancien_mod.pdf
biblio_traps_dynamics.bib
main.tex
Download as ZIP
Save to Dropbox
Source
Rich Text
Edit
Find
§
B
More
Preview
Manual
Auto
up-to-date and saved
\documentclass[conference]{IEEEtran}
\usepackage[utf8x]{inputenc}
\usepackage[english]{babel}
\usepackage[cmex10]{amsmath}
\usepackage{mathabx}
\usepackage{graphicx}
\usepackage{algorithmic}
\usepackage{array}
\usepackage{mdwmath}
\usepackage{mdwtab}
\usepackage{eqparbox}
\usepackage{todonotes}
\usepackage{url}
\hyphenation{op-tical net-works semi-conduc-tor}
\begin{document}
\title{\LARGE Modeling of Trap Induced Dispersion of Large Signal Dynamic Characteristics of GaN HEMTs}
\author{\authorblockN{
O. Jardel\authorrefmark{1},
S. Laurent\authorrefmark{2},
T. Reveyrand\authorrefmark{2},
R. Qu\'{e}r\'{e}\authorrefmark{2},
P. Nakkala\authorrefmark{2},
A. Martin\authorrefmark{2}
\\ S. Piotrowicz\authorrefmark{1},
M. Campovecchio\authorrefmark{2},
S.L. Delage\authorrefmark{1}}
\authorblockA{\authorrefmark{1}
III-V Lab, route de Nozay, 91461 Marcoussis Cedex, France}
\authorblockA{\authorrefmark{2}
XLIM, 7 rue Jules Valles, 19100 Brive-la-gaillarde, France
\\olivier.jardel@3-5lab.fr}}
\maketitle
\begin{abstract}
We propose here a non-linear GaN HEMT model for CAD including a trapping effects description consistent with both small-signal and large-signal operating modes. It takes into account the dynamics of the traps and then allows to accurately model the modulated large signal characteristics that are encountered in telecommunication and radar signals. This model is elaborated
Modeling of Trap Induced Dispersion of Large Signal Dynamic Characteristics of GaN HEMTs
O. Jardel*, S. Laurent†, T. Reveyrand†, R. Quéré†, P. Nakkala†, A. Martin†
S. Piotrowicz*, M. Campovecchio†, S.L. Delage*
*III-V Lab, route de Nozay, 91461 Marcoussis Cedex, France
†XLIM, 7 rue Jules Valles, 19100 Brive-la-gaillarde, France
olivier.jardel@3-5lab.fr
I. Introduction
II. Impact of traps on large signal characteristics
Figure 1. Representation of the mechanism induced by traps on the average drain current.


Overleaf
PROJECT
VERSIONS
COMPARE
John Lees-Miller
Current version
Source
Rich Text
Edit
Find
§
B
More
{Introduction}
Your introduction goes here! Some examples of commonly used commands and features are listed below, to help you get started. If you have a question, please use the help menu (``?'') on the top bar to search for help or ask us a question.
John Lees-Miller about 2 hours ago:
Seems punchier. OK?
John Hammersley replied about an hour ago:
Yep.
John Lees-Miller closed this about an hour ago.
{Some LaTeX Examples}
{How to Include Figures}
First you have to upload the image file (JPEG, PNG or PDF) from your
Compared version (read only)
first draft
Restore file
Abstract
Your abstract.
{Introduction}
This is where you write your introduction. Some examples of commonly used commands and features are listed below, to help you get started. If you have a question, please use the help menu (``?'') on the top bar to search for help or ask us a question.
{Some LaTeX Examples}
{How to Include Figures}
First you have to upload the image file (JPEG, PNG or PDF) from your computer to writeLaTeX using the upload link the project menu. Then use the includegraphics command to include it in your document. Use the figure environment and the caption command to add a number and a caption to your figure. See the code for Figure \ref{fig:frog} in this section for an example.
\begin{figure}
\centering
\includegraphics[width=0.3\textwidth]{frog.jpg}

" It really streamlined the process of writing the paper…
I was happy to find a **21st century solution**. "

Artem Kaznatcheev
Researcher at McGill University

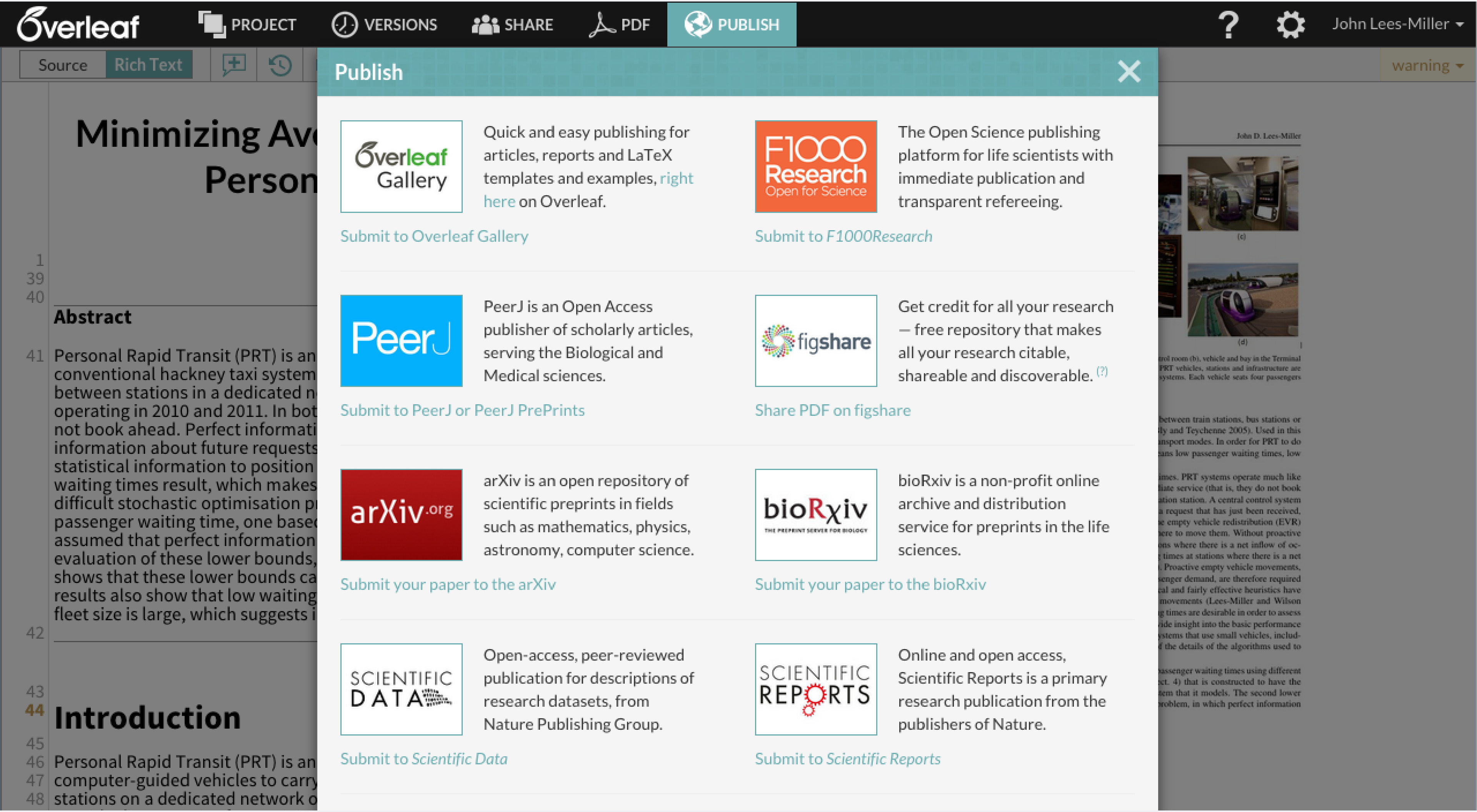
arXiv.org > q-bio > arXiv:1307.6914

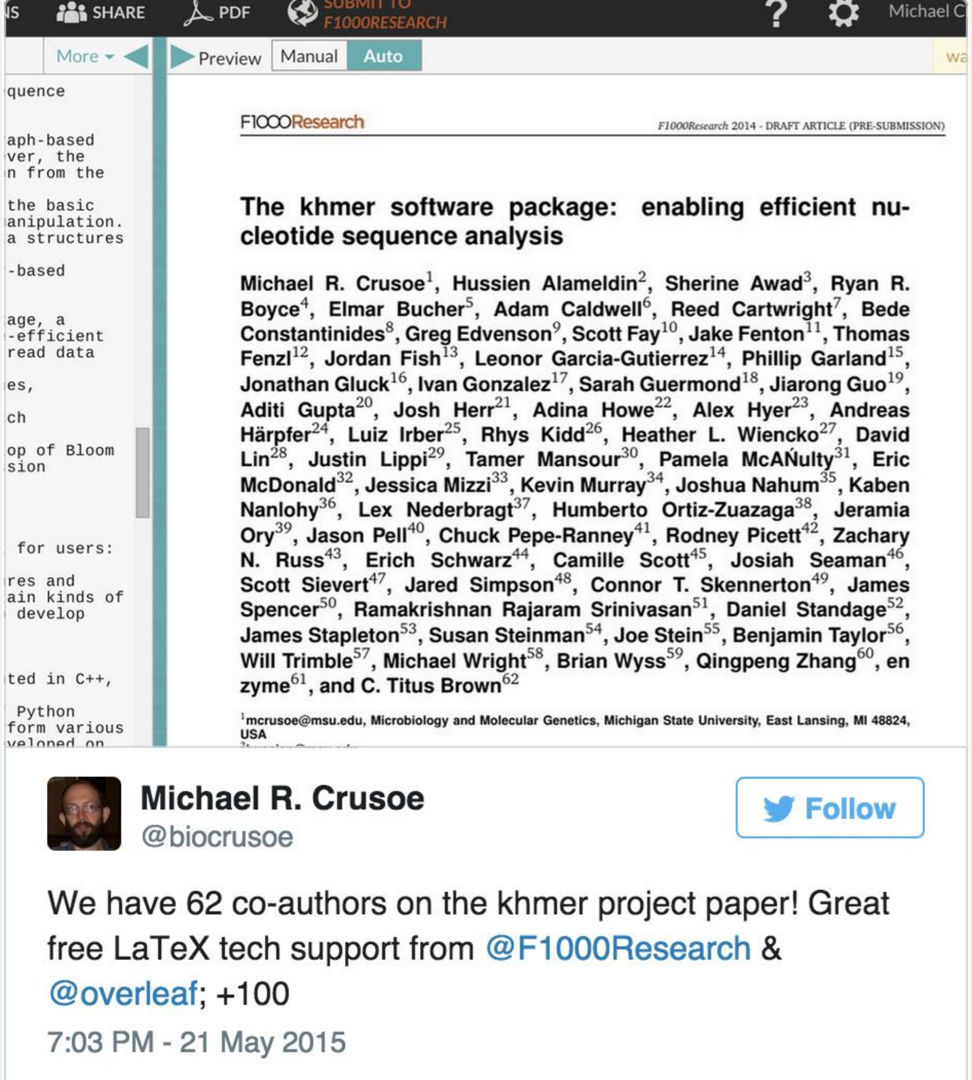
Quantitative Biology > Populations and Evolution

Edge effects in game theoretic dynamics of spatially structured tumours

Artem Kaznatcheev, Jacob G. Scott, David Basanta

Overleaf


Overleaf
PROJECT
VERSIONS
SHARE
PDF
PUBLISH
John Lees-Miller
Source
Rich Text
warning
Publish
Quick and easy publishing for articles, reports and LaTeX templates and examples, right here on Overleaf.
Submit to Overleaf Gallery
The Open Science publishing platform for life scientists with immediate publication and transparent refereeing.
Submit to F1000Research
PeerJ is an Open Access publisher of scholarly articles, serving the Biological and Medical sciences.
Submit to PeerJ or PeerJ PrePrints
Get credit for all your research — free repository that makes all your research citable, shareable and discoverable. (?)
Share PDF on figshare
arXiv is an open repository of scientific preprints in fields such as mathematics, physics, astronomy, computer science.
Submit your paper to the arXiv
bioRxiv is a non-profit online archive and distribution service for preprints in the life sciences.
Submit your paper to the bioRxiv
Open-access, peer-reviewed publication for descriptions of research datasets, from Nature Publishing Group.
Submit to Scientific Data
Online and open access, Scientific Reports is a primary research publication from the publishers of Nature.
Submit to Scientific Reports
Minimizing Av
Person
Abstract
Introduction

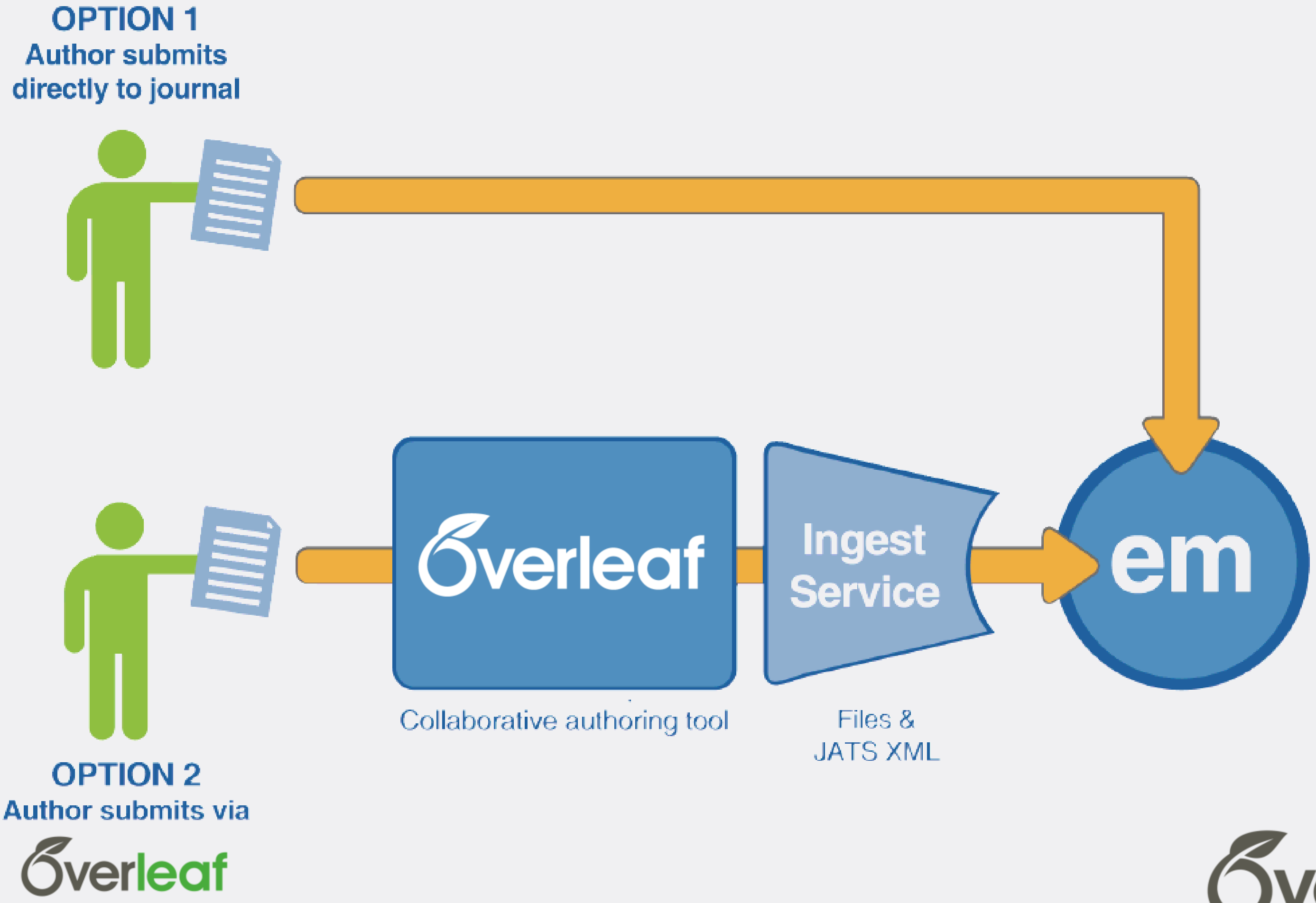

SHARE
PDF
SUBMIT TO F1000RESEARCH
More
Preview
Manual
Auto
F1000Research
F1000Research 2014 - DRAFT ARTICLE (PRE-SUBMISSION)
The khmer software package: enabling efficient nucleotide sequence analysis
Michael R. Crusoe[1], Hussien Alameldin[2], Sherine Awad[3], Ryan R. Boyce[4], Elmar Bucher[5], Adam Caldwell[6], Reed Cartwright[7], Bede Constantinides[8], Greg Edvenson[9], Scott Fay[10], Jake Fenton[11], Thomas Fenzl[12], Jordan Fish[13], Leonor Garcia-Gutierrez[14], Phillip Garland[15], Jonathan Gluck[16], Ivan Gonzalez[17], Sarah Guermond[18], Jiarong Guo[19], Aditi Gupta[20], Josh Herr[21], Adina Howe[22], Alex Hyer[23], Andreas Härpfer[24], Luiz Irber[25], Rhys Kidd[26], Heather L. Wiencko[27], David Lin[28], Justin Lippi[29], Tamer Mansour[30], Pamela McAÑulty[31], Eric McDonald[32], Jessica Mizzi[33], Kevin Murray[34], Joshua Nahum[35], Kaben Nanlohy[36], Lex Nederbragt[37], Humberto Ortiz-Zuazaga[38], Jeramia Ory[39], Jason Pell[40], Chuck Pepe-Ranney[41], Rodney Picett[42], Zachary N. Russ[43], Erich Schwarz[44], Camille Scott[45], Josiah Seaman[46], Scott Sievert[47], Jared Simpson[48], Connor T. Skennerton[49], James Spencer[50], Ramakrishnan Rajaram Srinivasan[51], Daniel Standage[52], James Stapleton[53], Susan Steinman[54], Joe Stein[55], Benjamin Taylor[56], Will Trimble[57], Michael Wright[58], Brian Wyss[59], Qingpeng Zhang[60], en zyme[61], and C. Titus Brown[62]
[1]mcrusoe@msu.edu, Microbiology and Molecular Genetics, Michigan State University, East Lansing, MI 48824, USA
Michael R. Crusoe
@biocrusoe
Follow
We have 62 co-authors on the khmer project paper! Great free LaTeX tech support from @F1000Research & @overleaf; +100
7:03 PM - 21 May 2015

Overleaf

*"The integration of Overleaf into our editorial workflow enabled the **swift processing** of the authors' manuscripts and **simplified the procedure** for our pre-publication checks."*

F1000Research
AN OPEN SCIENCE JOURNAL FOR LIFE SCIENTISTS

Overleaf


OPTION 1
Author submits directly to journal
Overleaf
Collaborative authoring tool
Ingest Service
Files &
JATS XML
em
OPTION 2
Author submits via
Overleaf

Overleaf

Demonstration template for submission to Aries Demo Journal A

Author: John Hammersley
License: Creative Commons CC BY 4.0 (?)

OPEN AS TEMPLATE | VIEW PDF

View Source | Download PDF

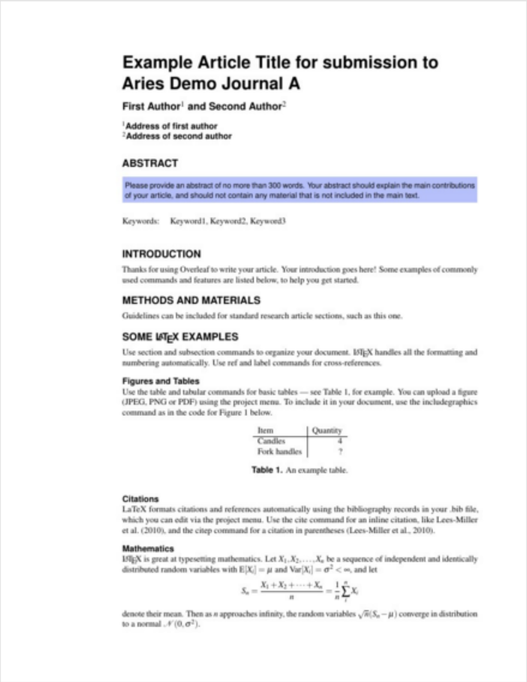
Abstract: This is an example journal template to demonstrate the integrated submission process from Overleaf to journals using the Aries Editorial Manager manuscript tracking system.

To test out the submission process, simply click the "Open as Template" button above to create a new project in Overleaf based on the journal template. Fill out any details you wish to in your demo article, and when ready, click the "Submit to Journal" button in the top bar of the Overleaf editor, and follow the instructions to complete your test submission.

If you're interested in find out more, or to set up a submission link like this for your journal(s), please get in touch - we'd love to hear from you!

Tags: Academic Journal | Aries Demo Journal A

Find More Templates



Example Article Title for submission to Aries Demo Journal A

First Author[1] and Second Author[2]

[1]Address of first author
[2]Address of second author

ABSTRACT

Please provide an abstract of no more than 300 words. Your abstract should explain the main contributions of your article, and should not contain any material that is not included in the main text.

Keywords: Keyword1, Keyword2, Keyword3

INTRODUCTION

Thanks for using Overleaf to write your article. Your introduction goes here! Some examples of commonly used commands and features are listed below, to help you get started.

METHODS AND MATERIALS

Guidelines can be included for standard research article sections, such as this one.

SOME LaTeX EXAMPLES

Use section and subsection commands to organize your document. LaTeX handles all the formatting and numbering automatically. Use ref and label commands for cross-references.

Figures and Tables

Use the table and tabular commands for basic tables — see Table 1, for example. You can upload a figure (JPEG, PNG or PDF) using the project menu. To include it in your document, use the includegraphics command as in the code for Figure 1 below.

Item	Quantity
Candles	4
Fork handles	?

Table 1. An example table.

Citations

LaTeX formats citations and references automatically using the bibliography records in your .bib file, which you can edit via the project menu. Use the cite command for an inline citation, like Lees-Miller et al. (2010), and the citep command for a citation in parentheses (Lees-Miller et al., 2010).

Mathematics

LaTeX is great at typesetting mathematics. Let $X_1, X_2, \ldots, X_n$ be a sequence of independent and identically distributed random variables with $E[X_i] = \mu$ and $Var[X_i] = \sigma^2 < \infty$, and let

$$S_n = \frac{X_1 + X_2 + \cdots + X_n}{n} = \frac{1}{n}\sum_i^n X_i$$

denote their mean. Then as n approaches infinity, the random variables $\sqrt{n}(S_n - \mu)$ converge in distribution to a normal $\mathcal{N}(0, \sigma^2)$.

Overleaf PROJECT VERSIONS SHARE PDF SUBMIT TO JOURNAL ? SIGN UP SIGN IN Journal A

Source | Rich Text | Edit | Find | § | B | I | Preview | Manual | Auto | up-to-date and saved

Example Article Title for submission to Aries Demo Journal A

\thispagestyle{empty}

Introduction

Thanks for using Overleaf to write your article. Your introduction goes here! Some examples of commonly used commands and features are listed below, to help you get started.

Methods and Materials

Guidelines can be included for standard research article sections, such as this one.

Some \LaTeX{} Examples

{sec:examples}

Use section and subsection commands to organize your document. \LaTeX{} handles all the formatting and numbering automatically. Use ref and label commands for cross-references.

Figures and Tables

Use the table and tabular commands for basic tables --- see Table~ {tab:widgets}, for example. You can upload a figure (JPEG, PNG or PDF) using the project menu. To include it in your document, use the includegraphics command as in the code for Figure~ {fig:view} below.

An example image of a frog.

\begin{table}[ht]

Example Article Title for submission to Aries Demo Journal A

First Author[1] and Second Author[2]

[1]Address of first author
[2]Address of second author

ABSTRACT

Please provide an abstract of no more than 300 words. Your abstract should explain the main contributions of your article, and should not contain any material that is not included in the main text.

Keywords: Keyword1, Keyword2, Keyword3

INTRODUCTION

Thanks for using Overleaf to write your article. Your introduction goes here! Some examples of commonly used commands and features are listed below, to help you get started.

METHODS AND MATERIALS

Guidelines can be included for standard research article sections, such as this one.

SOME LaTeX EXAMPLES

Use section and subsection commands to organize your document. LaTeX handles all the formatting and numbering automatically. Use ref and label commands for cross-references.

Figures and Tables

Use the table and tabular commands for basic tables — see Table 1, for example. You can upload a figure (JPEG, PNG or PDF) using the project menu. To include it in your document, use the includegraphics command as in the code for Figure 1 below.

Item	Quantity
Candles	4
Fork handles	?

Table 1. An example table.

Citations

LaTeX formats citations and references automatically using the bibliography records in your .bib file, which you can edit via the project menu. Use the cite command for an inline citation, like Lees-Miller et al. (2010), and the citep command for a citation in parentheses (Lees-Miller et al., 2010).

Mathematics

LaTeX is great at typesetting mathematics. Let $X_1, X_2, \ldots, X_n$ be a sequence of independent and identically distributed random variables with $E[X_i] = \mu$ and $Var[X_i] = \sigma^2 < \infty$, and let

$$S_n = \frac{X_1 + X_2 + \cdots + X_n}{n} = \frac{1}{n}\sum_i^n X_i$$

denote their mean. Then as n approaches infinity, the random variables $\sqrt{n}(S_n - \mu)$ converge in distribution to a normal $\mathcal{N}(0, \sigma^2)$.

Home page / author guidelines
http://www.editorialmanager.com/journalA

Editorial Manager portal
https://www.editorialmanager.com/journala

Submit to

Journal A

Thanks for using Overleaf to submit your article!

To send your article, please confirm your first and last name:

First Name	Last Name
John	Hammersley

The journal's editorial team will need these in order to grant you access to their submission portal.

When you submit using the button below, your manuscript and supporting files will be sent to the journal automatically, and you will receive a confirmation email from Overleaf. The journal's editorial team will then send you a follow-up email within one working day with instructions for how to complete your submission.

SUBMIT TO JOURNAL A

Go back to my project

Home page / author guidelines
http://www.editorialmanager.com/journalA

Editorial Manager portal
https://www.editorialmanager.com/journala

Submitted to Journal A

Thanks for submitting to Journal A! Your manuscript and supporting files have been sent directly to the journal's editorial team, and they will send you a follow-up email within one working day with instructions for how to complete your submission.

Please check your email for confirmation of your submission.

Our automated submission process is still in beta, and we welcome any feedback on how to improve the experience. Please send any feedback through our contact form.

Go back to my project

Journal A submission via Overleaf - Confirmation   Inbox x

welcome@overleaf.com

to john.hammersley

9:54 PM (0 minutes ago)

Dear John Hammersley,

Thanks for submitting to Journal A! Your manuscript and supporting files have been sent directly to the journal's editorial team, and they will send you a follow-up email within one working day with instructions for how to complete your submission.

For your reference you submitted this project on Overleaf, and you confirmed your first and last name as John Hammersley.

Overleaf

Our automated submission process is still in beta! We hope you enjoy the experience, and we welcome any feedback on how to improve — just get in touch via our contact form.

Overleaf

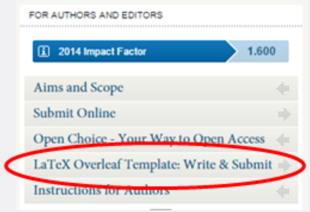
Journal A

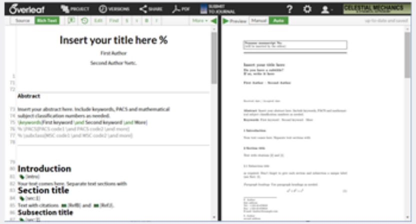
Editor 'To-Do' List

My Pending Assignments (1)

- Transferred Submissions (1)
- New Submissions Requiring Assignment (0)
- Revised Submissions Requiring Assignment (0)
- Submissions with Required Reviews Complete (0)
- Submissions Requiring Additional Reviewers (0)
- Submissions with One or More Late Reviews (0)

Action	Article Type	Article Title	Author Name	Transferred From	Initial Date Submitted	Status Date	Current Status
Details History File Inventory Edit Submission Send Back to Author Remove Submission Send E-mail		Insert your title here%	John Hammersley	Overleaf (WriteLatex Ltd)	23 Nov 2015	23 Nov 2015	Transferred Submission Received





DISCOVER

Author discovers option to write & submit using Overleaf.

CREATE

Template landing page for this journal opens on Overleaf.

WRITE

Template opens in Overleaf for author to write their article.

When article ready for submission, author clicks "Submit to Journal"

EDIT & RESUBMIT

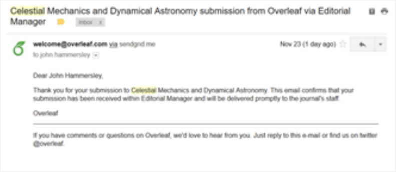
Author can continue to work on Overleaf if required.

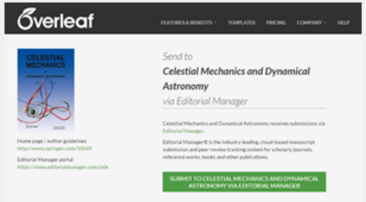
CONTINUE IN EM

Completion / Thank you page opens & email sent to author.

SUBMIT

Author can submit files directly to journal EM system.





Summary

- 300,000 users worldwide, free to authors.
- Direct submission into Editorial Manager via EM Ingest.
- Provides added value to authors, editors, reviewers and publishers.

Thanks for listening!

www.overleaf.com