

Nataliia Bielova

Chargée de Recherche (CRCN), Inria

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1 Education and employment

2020 - ongoing	Chargée de Recherche (CRCN) , PRIVATICS team at Inria Grenoble Rhône-Alpes administrative residence at Inria Sophia Antipolis – Méditerranée.
2016 - 2019	Chargée de Recherche (CR1, then CRCN) , INDES team at Inria Sophia Antipolis – Méditerranée
2013 - 2015	Chargée de Recherche (CR2) , INDES team at Inria Sophia Antipolis – Méditerranée.
2012 - 2013	Post-doc , CELTIQUE team at Inria Rennes Bretagne Atlantique
2010	Visiting scholar , Katholieke Universiteit Leuven, Belgium
2009	Visiting scholar Carnegie Mellon University, USA
2007 - 2011	PhD in Computer Science, University of Trento, Italy Date awarded: November 28, 2011

2 Prizes and awards

- Prestigious **ANR Jeunes chercheuses / Jeunes chercheurs (JCJC)** personal grant, Dec 2018 - Nov 2022.
- **Prime d'Encadrement Doctoral et de Recherche (PEDR)** d'Inria, Mar 2017 - Feb 2021.
- **LabEx postdoctoral fellowship**, Feb 2012 - Nov 2013.

3 Supervision of research activities

3.1 Supervision of post-docs

In the past, I have successfully supervised 3 PostDocs. Currently, I am a supervisor of 2 PostDocs – Cristiana Santos and Ruba Abu-Salma – whose funding has been secured by the Inria DATA4US Exploratory Action project.

3.1.1 Current PostDoc supervision

- **Cristiana Santos:** "Legal analysis of GDPR consent and GDPR rights in Web applications"
Dates: Mar 2020 - Feb 2022
Supervisors: Nataliia Bielova (50%) and Cedric Lauradoux (50%)
Funding: Inria DATA4US Exploratory Action project.
- **Ruba Abu-Salma:** "User-centered approach to Web tracking and GDPR rights"
Dates: Feb 2020 - Jan 2022
Supervisors: Nataliia Bielova (50%) and Cedric Lauradoux (50%)
Funding: Inria DATA4US Exploratory Action project.

3.1.2 Previous PostDoc supervision

- **Célestin Matte:** "Measuring legal compliance of IAB cookie banners"
Dates: Mar 2019 - Feb 2020
Supervisor: Nataliia Bielova (100%)
Funding: ANR JCJC PrivaWEB personal project.
- **Natasa Sarafijanovic-Djukic:** "Web tracking technologies via invisible pixels"
Dates: Dec 2016 - Nov 2017
Supervisors: Nataliia Bielova (50%) and Arnaud Legout (50%)
Funding: Inria Actions Marquantes project.
- **Minh Ngo:** "Information flow security monitors"
Dates: Oct 2016 - Sep 2017
Supervisors: Nataliia Bielova (50%) and Tamara Rezk (50%)
Funding: ANR AJACS collaborative project.

3.2 Supervision of PhD students

In the past, I have successfully supervised 1 PhD student – Francis Dolière Some – who defended his PhD in October 2018. Currently, I am a supervisor of 2 PhD students – Imane Fouad and Michael Toth. Their funding has been secured by PIA ANSWER collaborative project and ANR JCJC PrivaWEB personal project.

3.2.1 Current PhD supervision

- **Michael Toth:** "GDPR consent and dark patterns"
Dates: Dec 2019 - funding until Nov 2022
Supervisors: Nataliia Bielova (80%) and Vincent Roca (20%)
Funding: ANR JCJC PrivaWEB project.
- **Imane Fouad:** "Web tracking detection and measurement"
Dates: Jan 2018 - funding until Dec 2020).
Supervisors: Nataliia Bielova (50%) and Arnaud Legout (50%)
Funding: PIA ANSWER collaborative project.

3.2.2 Previous PhD supervision

- **Francis Dolière Some:** "Web Applications Security and Privacy"
Dates: Nov 2015 - Oct 2018
Supervisors: Nataliia Bielova (50%) and Tamara Rezk (50%)
Funding: ANR AJACS collaborative project

3.3 Supervision of interns

Starting from 2012, I have supervised 7 internship projects (Master/PhD level):

1. **Michael Toth**: "Dark patterns and GRPD consent"
Dates: Oct 2019 - Nov 2019
Supervisors: Nataliia Bielova (100%)
Level: Relai-de-these
2. **Hicham Lesfari**: "Web Tracking visualisation with Graph Mining Technics"
Dates: Jan 2019 - Mar 2019
Supervisors: Nataliia Bielova (50%) and Frederic Giroire (50%)
Level : Master (M2) internship.
3. **Hicham Lesfari**: "Understanding Web Tracking using Graph Mining Technics"
Dates: Nov 2018 - Dec 2019
Supervisors: Nataliia Bielova (50%) and Frederic Giroire (50%)
Level: PFE
4. **Imane Fouad**: "Web tracking via invisible Web beacons"
Dates: Mar 2017 - Aug 2017
Supervisors: Nataliia Bielova (50%) and Arnaud Legout (50%)
Level : Master (M2) internship.
5. **Leila Kuntar**: "Analysis of web tracking technologies that use 1x1 pixel image"
Dates: Dec 2016- Jan 2017
Supervisors: Nataliia Bielova (100%)
Level: PFE
6. **Doliere Francis Somé**: "Security constructs of JavaScript libraries in Web applications"
Dates: Jul 2015 - Sep 2015
Supervisors: Nataliia Bielova (50%) and Tamara Rezk (50%)
Level: Master (M2) internship.
7. **Patricio Palladino**: "Analysis of stability of web browser fingerprinting over time"
Dates: Mar 2013 - Jun 2013
Supervisors: Nataliia Bielova (100%)
Level: Master internship.

4 Scientific Responsibilities

Since my PhD, I am continuously being invited to serve in technical program committees of major international conferences and journals listed below.

4.1 Award Committees

- 2020 *Award co-Chair* of CNIL-Inria Privacy Protection Award
- 2020 *Commitee Member* of Caspar Bowden Privacy Enhancing Technologies Award
- 2019 *Award co-Chair* of CNIL-Inria Privacy Protection Award
- 2017 *Commitee Member* of Data Transparency Lab Award

4.2 Member of the Steering Committee

- 2018 - 2020 ACM Workshop on Programming Languages and Analysis for Security (ACM PLAS)

4.3 Chair of Conference Program Committees

2017 ACM Workshop on Programming Languages and Analysis for Security (PLAS'17) at ACM CCS'17

4.4 Member of the Conference Program Committees

I have been a member of more than 20 technical program committees, including the flagship top-level conferences in security and privacy (highlighted in bold), such as PETs, IEEE S&P and TheWeb conferences:

- 2021 IEEE Symposium on Security and Privacy (**IEEE S&P'21**)
Privacy Enhancing Technologies Symposium (**PETs'21**)
- 2020 Privacy Enhancing Technologies Symposium (**PETs'20**)
Security and Privacy Track of TheWeb Conference (**TheWeb 2020**)
- 2019 Privacy Enhancing Technologies Symposium (**PETs'19**)
IEEE European Symposium on Security and Privacy (**IEEE EuroS&P'19**)
IEEE Secure Development Conference (IEEE SecDev'19)
NDSS Workshop on Measurements, Attacks, and Defenses for the Web (MADWeb'19)
Atelier sur la Protection de la Vie Privée (French workshop on Privacy Protection, APVP'19)
- 2018 International Conference on Principles of Security and Trust (**POST'18**)
IEEE Secure Development Conference (IEEE SecDev'18)
Symposium on Electronic Crime Research (eCrime 2018)
International Workshop on Programming Technology for the Future Web (ProWeb 2018)
IEEE Workshop on Legal and Technical Issues in Cloud Computing and the Internet of Things (CLaw 2018)
Atelier sur la Protection de la Vie Privée (French workshop on Privacy Protection, APVP'18)
- 2017 IEEE Computer Security Foundations Symposium (**IEEE CSF'17**)
IEEE Secure Development Conference (IEEE SecDev'17)
ACM Workshop on Programming Languages and Analysis for Security (PLAS'17)
Workshop on Foundations of Computer Security (FCS'17)
International Workshop on Programming Technology for the Future Web (ProWeb'17)
IEEE Workshop on Legal and Technical Issues in Cloud Computing and the Internet of Things (CLaw 2017)
Atelier sur la Protection de la Vie Privée (French workshop on Privacy Protection, APVP'17)
International Conference on Math. Methods, Models and Architectures for Computer Networks Security (MMM-ACNS 2017)
- 2013 ACM SIGPLAN Workshop on Programming Languages and Analysis for Security (PLAS'13)

4.5 Invited reviewer for journals and conferences (after PhD)

Since obtaining my PhD, I have been invited to review scientific articles for numerous journal and international conference presented below. Each journal is presented only once. The flagship journals and conferences are highlighted in bold.

Journals: Journal of Computer Security (**JCS**), ACM Transactions on Internet Technology (**ACM TOIT**), ACM Transactions on Privacy and Security (**ACM TOPS**, ex. **ACM TISSEC**), IEEE Transactions on Dependable and Secure Computing (IEEE TDCS), Journal of Logical and Algebraic Methods in Programming (JLAMP), International Journal of Information Security (IJIS).

International Conferences and Workshops: Privacy Enhancing Technologies Symposium (**PETs'18**), Network and Distributed System Security Symposium (**NDSS'16**), ACM Conference on Computer and Communications Security (**ACM CCS'16**), Conference on Principles of Security and Trust (POST'16), USENIX Security Symposium (**Sec'16**), IEEE Computer Security Foundations Symposium (**IEEE CSF'14**), Conference on Principles of Security and Trust (POST'14), International Symposium on Games, Automata, Logics, and Formal Verification (GandALF'13), Conference on Principles of Security and Trust (POST'13), International Workshop on Security and Trust Management (STM'12), Asian Symposium on Programming Languages and Systems (APLAS'12).

4.6 Scientific Events Organisation

- 2018 General co-Chair of Atelier sur la Protection de la Vie Privée (APVP'18)
- 2017 General co-Chair of the **Dagstuhl Seminar** on Online Privacy and Web Transparency
- 2017 Member of the Poster session program committee of the USENIX Security Symposium (**Sec'17**)
- 2015 Publication Chair of the International Symposium on Engineering Secure Software and Systems (ESSoS'15)
- 2014 Publication Chair of the International Symposium on Engineering Secure Software and Systems (ESSoS'14)

4.7 Local responsibilities

- 2017-ongoing Member of Comité de Suivi Doctoral (CSD) of Inria Sophia Antipolis. The committee gives a scientific opinion on the hiring and extension of the PhD students' contracts at Inria and overlooks the overall work of PhD students. The CSD also evaluates candidates for the Inria PhD scholarships (CORDI-S).
- 2019 Member of the jury "soutenance de stage" of the UBINET master of the University of Nice Sophia Antipolis.
- 2018 Member of selection committee of Inria internship program "Masters transverses".

4.8 Scientific Exeprtise

- 2020 Member of the evaluation committee for the projects "Initiatives de Recherche Stratégiques (IRS)" of the University Grenoble Alpes
- 2019 Member of the hiring committee for an Inria chair position "Enseignement et recherche dans le domaine de la cybersécurité" of École Supelec

4.9 PhD committees

I have been a member of the PhD jury of the following PhD defense committees:

- 2020 Tobias Urban, Institute for Internet Security, Ruhr University Bochum, Germany
- 2019 Antoine Vastel, University of Lille & Inria Lille, France
- 2018 Daniel Schoepe, Chalmers University of Technology, Sweden
- 2018 Oleksii Starov, Stony Brook University, USA
- 2017 Pierre Laperdrix, INSA Rennes & Inria Rennes, France
- 2016 Willem De Groef, KULeuven, Belgium

5 Management

5.1 Research Projects

5.1.1 Industrial Collaborative Projects

PIA ANSWER The ANSWER project, "*Advanced aNd Secured Web Experience and seaRch*" (Jan 2018 - Dec 2021) is funded by PIA program. The aim of the ANSWER project is to develop the new version of the <http://www.qwant.com> search engine by introducing radical innovations in terms of search criteria as well

as indexed content and users' privacy. The partners of this project include QWANT and Inria teams Wimmics, Privatics, Indes, Neo and Diana.

5.1.2 National projects

ANR PrivaWEB The PrivaWeb project, “*Privacy Protection and ePrivacy Compliance for Web Users*” (Dec 2018 - Nov 2022) is funded by the ANR JCJC personal funding initiative. PrivaWEB aims at developing new methods for detection of new Web tracking technologies and new tools to integrate in existing Web applications that seamlessly protect privacy of users. PrivaWEB is a personal ANR JCJC project.

ANR AJACS The AJACS project, “*Analyses of JavaScript Applications: Certification Security*” (Dec 2014 - May 2018) is funded by the ANR. The goal of the AJACS project is to provide strong security and privacy guarantees on the client side for web application scripts. I was involved in the tasks WP2 Certified Analyses and WP3 Security of JavaScript Applications. The partners of this project include Inria teams Celtique (coordinator), Toccata, Indes and Prosecco.

5.1.3 Inria Internal Funding

AEx DATA4US AEx DATA4US project, “*Personal DATA Transparency for web USERS*” (Feb 2020 - Jan 2022) is a joint project with Cedric Lauradoux (PRIVATICS) granted by Inria exploratory action program. DATA4US tackles these interdisciplinary challenges by establishing collaborations with researchers in Law. DATA4US will propose a new architecture for exercising access rights that will explain the users whether their data has been legally collected and eventually help contact Data Protection Authorities for further investigations.

ADT FingerKit In the context of the Inria ADT call, I am involved in a *FingerKit: a Cloud Platform to Study Browser Fingerprints at Large* (2018 - 2020), lead by Walter Rudametkin from the Spirals project-team, Inria Lille. The funding for a two year engineering position was obtained and an engineer is hired in Spirals project-team.

Actions Marquantes The joint project with Arnaud Legout from Inria Diana team “*User discrimination on the Web: measurement, causation and prevention*” (Dec 2016 - Nov 2017) is funded by Inria Sophia Antipolis Actions Marquantes initiative. The goal of this project is to detect when users get discriminated on the Web, what are the technologies used to discriminate users and how we can prevent it without breaking the functionality and sometimes useful personalisation within Web applications.

6 Teaching

- 2018 - 2020 Lecturer for “**Privacy on the Internet**”, SKEMA Business school, France
Program: Master in Digital Business
Level M2, 15h ETD per year
- 2018 - 2020 Lecturer for “**Security and Ethical aspect of Data**”, Université Côte d’Azur, France
Program: Master in Data Science
Level M1, 18h ETD per year
- 2018 - 2019 Lecturer for “**Web Privacy**”, University of Trento, Italy
Level PhD, 30h ETD per year
- 2015 - 2018 Lecturer for “**Développements d’Applications Réticulaires**”, University Pierre et Marie Curie - UPMC, France
Level M2, 15h ETD per year
- 2012 - 2013 Teaching Assistant for “**Sécurité des systèmes d’information**”, University of Rennes 1, France
Level M2, 19h ETD
- 2012 - 2013 Teaching Assistant for “**Compilation**”, INSA Rennes, France
Level M1, 20h ETD

6.1 E-learning

In 2018, together with Cédric Lauradoux and Vincent Roca (Inria PRIVATICS team), we have designed a Massive Open Online Course (MOOC) entitled “*Protection de la vie privée dans le monde numérique*”. From 2018 till May 2020, the MOOC has been open for 4 sessions and attracted in total **over 43,000 French-speaking participants** from all over the world.

7 Dissemination of scientific knowledge

I have been an invited speaker and invited lecturer at international conferences, workshops and summer schools since I obtained my PhD in 2011. In this section I also present scientific mediation and popularization activities I have carried out after my PhD.

7.1 Invited talks

- 2019 Invited talk on Detection of Web tracking missed by browser extensions at the Mozilla Security Summit, Vienna, Austria <https://events.mozilla.org/mozillasecurityresearchsummit2019>
- 2019 Keynote at the the Francophone workshop on Privacy Protection “l’Atelier sur la Protection de la Vie Privée” (APVP’18) in Cap-Hornu, France <https://project.inria.fr/apvp2019/>.
- 2018 Keynote at the Journee scientifique RISE/DS4H of Universite Cote d’Azur, France <http://univ-cotedazur.fr/contenus-riches/agenda/fr/journee-scientifique-vie-privée-numérique>
- 2018 Invited talk at the "Transparence et opacite des systemes d’information" workshop in Lyon, France <http://transparence.conf.citi-lab.fr/>.
- 2018 Invited talk at the Journées Scientifiques Inria, Bordeaux, France. <https://journées-scientifiques2018.inria.fr/francais-programme/>.
- 2017 Invited talk at the **EU Parliament** meeting dedicated to the analysis of the new EU ePrivacy Regulation in Brussels, Belgium. I presented our work on web tracking via browser extension fingerprinting [2]. <https://www.inria.fr/fr/vie-privée-internet-parlement-europeen>
- 2017 Invited talk at the SySoSec seminar, Inria Rennes. http://seminaire-dga.gforge.inria.fr/archives_fr.html#16-17
- 2017 Invited talk at the Russian-French Workshop in Big Data and Applications, Higher School of Economics, Moscow, Russia <https://bi.hse.ru/en/rfw/2017>
- 2016 Invited talk at the CAPPRIS Inria Collaborative Action meeting, Sophia Antipolis, France. <https://cappris.inria.fr/>
- 2013 Invited speaker at the panel of International Conference on Runtime Verification, Rennes, France. <http://rv2013.gforge.inria.fr>
- 2013 Invited talk at Dagstuhl Seminar: Verifiably Secure Process-Aware Information Systems, Wadern, Germany. <https://www.dagstuhl.de/en/program/calendar/semhp/?semnr=13341>
- 2012 Invited talk at Dagstuhl Seminar: Web Application Security, Wadern, Germany. <https://www.dagstuhl.de/en/program/calendar/semhp/?semnr=12401>
- 2012 Invited talk at Security and Formal Methods seminar, Inria Rennes, France. <http://videos.rennes.inria.fr/interne/Seminaire-Celtique/Nataliia-Bielova/index.html>

7.2 Invited lectures

- 2019 Invited lecture on GDPR consent mechanisms in Web applications at the Summer School on Cybersecurity, Université Cote d’Azur, France
- 2018 Tutorial on Web Tracking Technologies at TheWeb’18 International conference, Lyon, France
- 2018 Invited lecture on Web tracking technologies and protection mechanisms at Carnegie Mellon University, USA
- 2018 Invited lecture on Web Privacy at the Summer School ResCom, France
- 2018 Invited lecture on Web tracking technologies at SKEMA Business school, France
- 2018 Invited lecture on Web Tracking, Privacy and Transparency Measurements at the Summer School on Cybersecurity, Université Cote d’Azur, France
- 2017 Invited lecture on Web tracking technologies and protection mechanisms at Carnegie Mellon University, USA
- 2017 Invited lecture on Web Tracking Technologies at Igor Sikorsky Kiev Polytechnic Institute, Kiev, Ukraine

7.3 Impact on society

- 2020 I co-author **ROBERT protocol** [1] implemented in the **StopCovid** mobile contact tracing application deployed in France by the French Government in the context of the Covid-19 pandemic and intended to warn of possible contamination. <https://fr.wikipedia.org/wiki/StopCovid>
- 2019 “None Of Your Business” (NOYB) NGO issued a **complaint to the French Data Protection Authority (CNIL)** based on the results of our work on the potential violations of GDPR and ePrivacy directive in cookie banners [3]. NOYB used our open source “Cookie Glasses” browser extension that brings transparency to the banners that rely on IAB Europe TCF. The complaint addressed three popular French websites: CDiscount, AlloCine and VanityFair. <https://noyb.eu/en/say-no-cookies-yet-see-your-privacy-crumble>

7.4 Mentorship

- 2020 Presentation to female MSc students of UBINET on career in research, Nice, France.
- 2019 Presentation to BSc and MSc students during the ACM-W Ukrainian Chapter celebration, Kiev, Ukraine. <https://women.acm.org/2019-2020-celebrations/>

7.5 Popularization of scientific knowledge

- 2019 Intervention with high school students during “Semaine De La Science” with Cinesciences at the cinémathèque of Nice, France.
- 2019 I am a contributor of the Inria white book on CyberSecurity: I provided an overview of the research in the area of Web Tracking technologies carried out by Inria teams. <https://hal.inria.fr/hal-01993308>
- 2017 I have contributed the article by LINC of the CNIL on the usage of browser extensions for Web tracking, that highlights our research [2], <https://linc.cnil.fr/fr/inria-research-project-tries-uncover-how-websites-can-dig-your-preferences-online>
- 2017 Presentation “Technologies et Protection de votre vie privée sur Internet” at Cafe-techno organised by Inria, <http://univ-cotedazur.fr/contenus-riches/agenda/fr/cafe-techno-technologies-et-protection-de-votre-vie-privee-sur-internet-par-nataliia-b>
- 2016 Leading author of the article for general public in ERCIM News: “ *Using JavaScript Monitoring to Prevent Device Fingerprinting*”, <https://ercim-news.ercim.eu/en106/special/using-javascript-monitoring-to-prevent-device-fingerprinting>
- 2013 Presentation “Web Tracking technologies and privacy protection on the Web” at Conf’Lunch, Inria Rennes, France. <http://videos.rennes.inria.fr/confLunch/NataliiaBielova/indexConfLunchBielova.html#expose>
- 2013 Co-author of the article for general public “L’équipe Celtique et la protection de la vie privée sur le web” at Ouest Inria, that presented our approach for quantifying Web browser fingerprinting, <https://iww.inria.fr/ouest-inria/protection-de-la-vie-privee-sur-le-web/>

7.6 Interviews by the media

- 2020 Interview in MediaPart: *“Donnees personnelles: les cookies resistant encore”*. I presented our work on verifying legal compliance of cookie banners with GDPR and ePrivacy [3], <https://www.mediapart.fr/journal/france/190220/donnees-personnelles-les-cookies-resistant-encore>.
- 2019 Interview in Usine Digitale: *“Fuite massive de données à AccorHotels : ce que risque l’entreprise”*. I explained the problem of data breaches and massive data collection, data minimisation and purpose limitation principles of the GDPR, <https://www.usine-digitale.fr/article/fuite-massive-de-donnees-a-accorhotels-que-risque-l-entreprise-N906279>
- 2019 Interview in L’OBS: *“Entre réalité augmentée et reconnaissance faciale, on a parcouru le supermarché de demain”*, I explain the meaning of valid consent under GDPR, problem of consent and third-party data usage and data minimisation principle: *“Si vous me ciblez par rapport à mon âge, vous n’avez pas besoin de mon visage !”* <https://www.nouvelobs.com/economie/20191129.OBS21725/entre-realite-augmentee-et-reconnaissance-faciale-on-a-parcouru-le-supermarche-de-demain.html>
- 2018 Interview in NiceMatin: *“Comment mieux protéger sa vie privée en naviguant sur internet? Les conseils d’une spécialiste”*. I explained how Web browser cookies and other tracking technologies work and demonstrated our research on how users can be tracked by the fingerprint of their browser extensions [2]. <https://www.nicematin.com/faits-de-societe/comment-mieux-protger-sa-vie-privee-en-naviguant-sur-internet-les-conseils-dune-specialiste/>
- 2017 Interview in DCloudNews: *“Les mouchards du web épinglés par une jeune chercheuse de l’INRIA”*. I explained how Internet users can be tracked on the Web thanks to the browser extensions they install [2] and how the new ePrivacy Regulation could protect the users. <http://www.dcloudnews.eu/les-mouchards-du-web-epingles-par-une-jeune-chercheuse-de-linria/>.
- 2015 Interview in “Science et vie” magazine: *“Achat sur Internet – Des prix à la tête du client!”*, No. 1177. I was involved in this article thanks to my knowledge on Web tracking techniques and to my research on Price Discrimination of Online Airline Tickets [4].