**Petition letter for classification as an alien of extraordinary ability**

Dear immigration officer,

My name is Clement Riedel. I am 29 year old and have a French nationality. I am a postdoctoral fellow in nano-bio-physics at the University of California in Berkeley, United States of America (USA). My field of expertise is the use of nano-metric resolution techniques to study dielectric, energetic and dynamics properties of soft and biological material. The following is respectfully submitted in support of my petition for classification as an alien of extraordinary ability under section 203(b)(1)(A) of the Immigration and Nationality Act (First Preference, EB-1A). In this petition I will expose evidence, statement and facts that prove that:

A/ I meet 7 regulatory United States Citizenship and Immigration Services (USCIS) criteria establishing that I have extraordinary ability in my field:

1/ I have personally received an internationally recognized award for excellence in my field: The Human Frontier Science Program (HFSP) Fellowship, a 145 000 USD grant awarded on a highly selective process.

2/ I am part of the Biophysical Society and Sigma Xi, associations that require outstanding achievements of their members.

3/ Material has been published about me and my work on HighBeam Research, a major online premium information service having 400000 unique visitors (including students, scientists and general audience) monthly.

4/ I have judged other scientists work by reviewing articles in renowned and eminent professional journals (Applied Physics Letters, Nanoscale) in my field of specialization.

5/ I have demonstrated authorship of 12 original scholarly articles (10 as first author) in prestigious, international, peer-reviewed journals; 2 book chapters; and gave 10 oral presentations in highly selective conferences or illustrious universities. My research has been cited in peer-reviewed journals more than 100 times (and more than 80 without self-citations) according to the Web of Science (Thomson Reuters).

6/ I have made original scientific contributions of major significance, qualified as “outstanding; paradigm shift; fundamental breakthrough that will lead to other incremental discoveries” by distinguished experts in the field.

7/ I have been employed in a critical and essential capacity at the University of California in Berkeley (UCB). UCB has a distinguished reputation: researchers from this university won 72 Nobel Prizes and in 2013 it ranked 3rd of the Academic Ranking of World Universities.

B/ I have sustained national and international acclaim: All results exhibiting excellence in my research field have been obtained evenly over the last five years until the submission of this application. Above meeting the regulatory USCIS criteria, I will demonstrate that I am currently one of that small percentage who has risen to the very top of my field.

C/ I intend to continue to work in my area of extraordinary ability in the USA. I will keep performing research in nano-bio-physics at UCB, funded by the Howard Hughes Medical Institute (HHMI), a prestigious USA non-profit medical and biological research organization. This fundamental research has wide ranging implications and will substantially benefit the USA.

In order to prove this three points I will provide exhibits such as reference letters that I am going to introduce now. A panel of 7 experts have accepted to support this petition (Exhibits 70). All of them are internationally acclaimed and respected: they have permanent research positions as group leader in prestigious universities, post of CEO or are editors of distinguished peer-reviewed journals. They are evenly distributed between USA and foreign citizens showing that my work has reached and sustained national and international acclaim. The panel is also evenly composed of members of my inner circle (such as supervisors and colleagues) that can attest of my essential role in the scientific contribution and independent experts that objectively argue that my work is of major significance and has widely spread to the entire scientific community and beyond. All these competent and well recognized experts state that I am today part of the very best in my field.

Before starting the demonstration, I will raise a last important argument. I obtained my diploma of Doctor at the age of 25, about 7 years before the median graduation age of 32 (in USA, in science and engineering fields, as reported by Hoffer and Welch for the National Science Foundation in NSF 06-312, “Time to Degree of U.S. Research Doctorate Recipients”). Today, at the age of 29, I am still at the beginning of my career (at this age most researchers are in the middle of their PhD with few or no important scientific results). I am eager to have a successful career in my field of expertise that will benefit me and the USA. I want to work in the USA because I believe it is the best place in the world to perform research in dielectric, energetic and dynamics properties of soft and biological material at the nanoscale.

**A/ USCIS regulatory criteria & B/ Sustained international acclaim, top of the field.**

**1/ Received internationally recognized award**

I have personally received an internationally recognized award for excellence in my field: The Human Frontier Science Program (HFSP) Fellowship, a 145 000 USD grant awarded on a highly selective process (see the award’s attestation: Exhibit 11). The fellowship has been awarded to me personally, in 2011, not to my supervisor nor the host university. One of the four main criteria to obtain the fellowship is the candidate previous accomplishment. The HFSP is a notorious organization that supports innovative basic research focused on the complex mechanisms of living organisms. According to their annual report for the fiscal year 2012/2013 (<http://www.hfsp.org/about-us/annual-reports>) the organization “paid 53.079 million USD to its awardees during fiscal year 2012”. As described in Ex. 11, the “program is highly selective supporting only the 10-20% of the applicants”. “An international review panel evaluates applications for HFSP fellowships” (<http://www.hfsp.org/review-procedure>). The HFSP fellowships are “recognized internationally as prestigious award” (Ex. 11).

Note: Lesser, I have been a laureate of the Janus program (an award nationally recognized in France) in 2005 for “exclence..) rgsdg sg

To summarize I am part of the very best of my field which have obtained a famous, highly selective and financially important international award for the excellent research I have performed.

**2/ Part of associations that require outstanding achievements**

I am part of the Biophysical Society and Sigma Xi, associations that require outstanding achievements of their members.

“Membership in Sigma Xi is by invitation. Full membership is conferred upon those who have demonstrated noteworthy achievements in research. Each year the Society initiates nearly 5,000 new members. Over the course of the Society's distinguished history, more than 200 members have won the Nobel Prize and many more have earned election to the National Academies of Sciences and Engineering.”

**3/ Material published about me and my research**

Material entitled “New Nanotechnology Findings from C. Riedel and Co-Authors Described” has been published about me and my research by HighBeam Research (www.highbeam.com) in July 2011 (see Ex ). According to their website, HighBeam Research “is a premium information service built for students, instructors, researchers, professionals, and others looking to gain deep knowledge on subjects of interest.” HighBeam Research is a major media publication: They have a very high number of unique visitors: 400000 monthly (around the date of submission of this application, according to compete.com). In comparison, www.nanotechweb.org, a good scientific information website of the Institute of Physics has 4000 unique visitors monthly (according to the same source).

**4/ Review the work of other scientist**

I have reviewed in APL and Nanoscale.

As des is indeed prestigious and unique. An invitation to serve in an editoral board of JAA is an acknowledgment of the researcher’s superior knowledge and expertise in his field of study and work. To be asked to conduct peer review for prestigious journals like PNAS, JTB, PPL, IJMB is also one of the highest marks of respect bestowed upon a researcher in his field. These journals have very high standard to select the most prominent editors and reviewers to ensure the high quality of the publications. Therefore, as a top expert in his field, Dr. Liu has certainly met the criteria of judging other’s works.

**5/ Outstanding authorship**

I have demonstrated authorship of 12 original scholarly articles (10 as first author) in prestigious, international, peer-reviewed journals; 2 book chapters and 10 oral presentations in selective conferences or illustrious universities. My original research has been cited more than 100 times (and more than 80 without self-citations, according to ISI Web of Knowledge). My complete authorship is listed and summarized in my CV (Exhibit XXX). In this section I will: detail my authorship; describe the excellence of the journals, conferences and universities in which I have presented my work; define the tools and concepts that show that my research is outstanding and has spread in the USA and internationally. This section is divided into: original publication; non original publication and book chapters; oral presentations.

Note: A detailed list of the journals, books and institutes (including my personal contribution, a description of the diffusing vector and statistics) is presented in the Annex “Description of the journals, conferences and universities in which I have presented my research or review.”

**a) Original publications in peer reviewed journals**

A scientific original publication is composed of contents (such as texts, figures, experimental design, data analysis, concepts, theories, simulations, equations…) that have not been previously published or displayed in a journal or in an electronic format.

A peer reviewed journal is a journal in which the scientific publication is evaluated first by the editor and then by a panel of independent experts in the field (having similar or superior competences to the authors). The peer reviewed process is highly selective in all the journals in which I have published or review. This selectivity is related to the high quality and standards of the journals that I am going to demonstrate now.

**- Quality of the journals in which I published my research**

Several indicators can be used to determine the quality of a journal. I will here in detail the impact factor, total number of citations and total number of articles published in a year. These indicators are calculated by Thomson Reuters. They are available online at the **Web of Science in the Journal Citation Reports** (JCR), Science Edition. All data are presented for the JCR year 2012 (most recent year available).

- The impact factor (IF) is calculated by dividing the number of citations in a calendar year to the source items published in that journal during the previous two years. Therefore, in average, it is the number of citation you can expect for one article during the two years following its publication. The impact factor is a good indicator of the potential research spreading in the scientific community. **I have only published in journals having high impact factors** (see Annex for individual description).

- The total number of citations (in 2012) of the journal and their ranking in their category are other important numerical parameters. My research has been published in journals ranking at the very best of their field in terms of total citation: **Five of my articles have been published in journals ranking #1 and two in journals ranking #2 (worldwide for the total number of citations, in their categories).**

- The total number of articles published in the journal should also be taken into account. 8 articles have been published in journals ranking #3, #4, #19, #85 and #91 over the 8471 total journal referenced by ISI Web of knowledge. **These 8 articles have therefore been published in the ~1% best journals in terms of number of articles published (other the 8471 journals referenced in the JCR).**

Note: All the statistics introduced above (IF, number of citations, number of articles) are reported for each individual journals in the Annex.

**- Quality of my research**

Three of the main tool to quantify research importance of articles are: the total number of citations in original and peer-reviewed journals; the number of citations with and without self-citation.

**Statistics ISI Web of Knowledge:**

Number of publications: 12

Sum of the Times Cited: 103

Sum of Times Cited without self-citations: 80

Citing Articles: 57

Citing Articles without self-citations: 48

The detailed list of the 12 original publications and their individual statistics (from Web of Science) are displayed in Exhibit XXX. It should be considered that research in nano-bio-physics of soft and biological material is extremely challenging and it is still at its early stage. It’s an emerging and promising area and is a truly interdisciplinary field of science, which combines biology, physics with sophisticated data analysis. It requires a much longer time to collect high-quality data for publication than other research areas. Only very few most talented researchers are able to work in this area. Therefore, a citation record of more than 100 in this field is considered extraordinary (with an even stronger weight considering that I am below 30 year old).

I have mainly published my research in the USA (American Institute of Physics, American Chemical Society, American Physical Society…) and in Europe (Institute of Physics, Elsevier, Royal Society of Chemistry…), geographical zones where most experts in my research area are working.

My work has been cited, in prestigious international peer reviewed journals, by leading groups in my field in: USA (Brown, Hess, Magonov); Spain (Gramse, Sacha, Kumali); Wales (Lilliu); Belgium (Napolitano); Italy (Nguyen); Germany (Gloman); Japan (Ishii, Umeda); Argentina (Miccio); China (Peng, Sun); Greece (Spyropoulos). In parenthesis are the lead authors’ name of the main groups citing my work. All citations are about my research are positive. This fact shows that my work has been recognized and spread in USA and internationally. Please refer to the “Selection of citing articles without self-citations” (Exhibit XXX) for more details.

has been cited by various independent researchers in their own works, which were published again in top journals and conferences across the world, has demonstrated widespread interest in, and reliance on his work, and has provided strong evidence that other researchers have been significantly influenced by Dr. Liu’s research work. These citations show that numerous other researchers have acknowledged Dr. Liu’s influence and found his contributions to be significant.

**b) Non original publications (virtual journals) and book chapters**

Virtual journals and book chapter often (and always in my case) display non original scientific content in the sense that the research has already been published elsewhere. Most of the time (and always in my case), as the research has already been published, there is no peer review process. These publications are less selective than the original ones. However, being based on an invitation from the editor, my virtual journals and book chapters publication show that I am “a specialist in [my] field of research” selected upon my “publishing history and the quality of [my] research” (Ex. XXX). Moreover, when the book is published by a renowned publisher such as InTech (for which I have published as first author) the open access (online access at no cost for the reader) and high number of unique visitors (490000 monthly according to their website) maximizes the opportunity for research to spread (inside and outside of the scientific community) and for authors to be recognized. The same criteria of free of charge distribution for subscribers and high number of unique monthly visitors (120000) apply for my article (as first author) published in Microscopy and analysis.

Note: Further description of the journals and publisher is given in the annex.

**c) Oral presentations**

I gave oral presentations (invited by prestigious universities or in conferences upon a highly selective process) in: USA (Massachusetts Institute of Technology, UC Berkeley, Northeastern University); Japan (XII International Scanning Probe Microscopy); France (11em Forum des microscopies à sonde locales, De Gennes Discussion); Spain (XI International Scanning Probe Microscopy); Chile (University of Chile).

**Conclusion on the outstanding authorship**

**6/ Original scientific contribution of major significance**

I made original scientific contributions of major significance, qualified as “outstanding; paradigm shift; fundamental breakthrough that will lead to other incremental discoveries” by eminent experts in the field. My major original and outstanding contributions are summarized below, classified by project:

**a) Characterizing polymer properties at macroscopic scale using broadband dielectric spectroscopy and rheology**

I have shown that polymers with a low molecular weight are described by the Rouse theory. A new original experiment has been developed where both mechanical and dielectric measurements were performed at the same time on the same sample. The data were then analyzed (Macromolecules **42**(21): 8492-8499). Effects of entanglement on dielectric spectra have been discussed (Rheologica Acta. **49**(5):507-512).

**b) Measuring dielectric properties of polymers at the nanoscopic scale using Atomic Force Microsopy**

Using the numerical simulation of the Equivalent Charge Method, the value of the static dielectric permittivity has been quantified from the measurement of the force gradient created by a VDC potential between a tip and a grounded dielectric. This paper (JAP **106**(2):024315), published in the Journal of Applied Physics (journal ranking #2 in Applied Physics) that has an impact factor of 2.2 has, been cited 12 times during the two years following its publication (and 21 in total, see Exhibit XXX). This fact shows that my research has spread above the regular standard of the journal.

This method allows a quantitative mapping of dielectric properties with a 40 nm spatial resolution and is therefore suitable for the study of nano-defined domains (Physical Review E **81**(1): 010801).

The electrical phase shifts in the 2ω component of the force or force gradient created by VAC voltage, ΔΦ2ω, are related with dielectric losses. Crider *et al* (Applied Physics Letters **91**(1):013102) have shown that the dynamics at the near free surface of polymer films is faster than the one in bulk by measuring the frequency dependence of ΔΦ2ω. We have extended this method to map the temperature-frequency dependence of the dielectric losses related with the activation of the segmental relaxation (Applied Physics Letters **96**(21): 213110).

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**c) Characterizing the effect of the heat released during a single chemical reaction on the enzyme catalyzing the reaction using Fluorescence Correlation Spectorcopy**

The electrical phase shifts in the 2ω component of the force or force gradient created by VAC voltage, ΔΦ2ω, are related with dielectric losses. Crider et al (Applied Physics Letters 91(1):013102) have shown that the dynamics at the near free surface of polymer films is faster than the one in bulk by measuring the frequency dependence of ΔΦ2ω. We have extended this method to map the temperature-frequency dependence of the dielectric losses related with the activation of the segmental relaxation (Applied Physics Letters 96(21): 213110).

**7/ Critical and essential role at UCB**

With 72 Nobel Laureates affiliated with the university, UC Berkeley is one of the leading research universities in the world. According to the National Research Council, 35 of 36 its graduate programs rank in the top 10 in their respective fields. UC Berkeley is the only university in the nation to achieve top 5 rankings for all of its PhD programs in those disciplines covered by the US News and World Report survey.

**C/ Continue to work in my field of extraordinary ability in the USA**

I played a critical and essential role at the University of California in Berkeley.

**Annex: Description of the journals, conferences and universities in which I have presented my research or review.**

This annex describes the main journals, conferences and universities in which I have presented my research. This annex is being referred to in section 4 “Review of the work of other scientist” and section 5 “Outstanding authorship”. All statistics are from the Journal Citations Reports, Science Edition, Year 2012, available online at the Web of Science (by Thomson Reuters). The format for the description of a journal is the following:

**Name of the journal / conference / university** (Abbreviation) Personal contribution, Impact Factor (IF), Total cites of the journal (ranking in their category), Number of articles published by the journal (ranking over the 8471 journals reference by ISI Web of Knowledge), Country of origin. Description.

**a) Original journals and their publishers:**

**Journal of Applied Physics** (JAP) 2 articles, 1 as 1st author, IF: 2.2, Total cites: 136103 (#2 in Applied Physics), Articles: 4356 (#4), USA: “JAP is an influential international journal publishing significant new experimental and theoretical results of applied physics research. Topics covered in JAP are diverse, reflecting the most current applied physics research, and include areas of particular emerging interest.  Content is published online daily and collected into weekly online and printed issues (48 issues per year).”

<http://scitation.aip.org/content/aip/journal/jap>

**Applied Physics Letters** (APL) 2 articles as 1st author & Reviewer, IF: 3.8, Total cites: 212433 (#1 in Applied Physics), Articles: 4976 (#3), USA. APL is an international journals that “features concise, up-to-date reports on significant new findings in applied physics. Emphasizing rapid dissemination of key data and new physical insights, APL offers prompt publication of new experimental and theoretical papers bearing on applications of physics phenomena to all branches of science, engineering, and modern technology. Content is published online daily, collected into weekly online and printed issues (52 issues per year).”

<http://scitation.aip.org/content/aip/journal/apl>

**American Institute of Physics** (AIP), USA: JAP and APL are published by AIP. “One of the world’s largest publishers of scientific information in physics and the related sciences, AIP Publishing employs innovative technologies and offers publishing services for the American Institute of Physics and AIP Member Society publishing partners. AIP Publishing’s suite of publications includes 17 journals, three of which are published in partnership with other organizations; magazines, including AIP’s flagship publication Physics Today; and the AIP Conference Proceedings series.” <http://scitation.aip.org/content/aip/>

**Macromolecules** 1 article as 1st author, IF: 5.5, Total cites: 97921 (#1 in Polymer Science), Articles: 1069 (#85), USA: “Macromolecules publishes original research on all fundamental aspects of macromolecular science including synthesis, polymerization mechanisms and kinetics, chemical modification, solution/melt/solid-state characteristics, and surface properties of organic, inorganic, and naturally occurring polymers. The papers showcase innovative concepts, experimental methods/observations, and theoretical approaches. That research is presented in comprehensive reports, brief communications to the editor, and technical notes.”

<http://pubs.acs.org/page/mamobx/about.html>

**American Chemical Society** (ACS), USA: Macromolecules is published by the ACS. “ACS Publications manages the scholarly publishing program of the world’s largest and most influential scientific society. Every year over 100,000 authors and their research teams from the community of scientists worldwide submit their work for consideration, review, and publication to ACS Publications. Noted for their high quality, rapid time to publication, seminal, and high impact, and prevalent citation in future research, ACS journals are available at more than 5,000 academic, business, and corporate institutions worldwide. ACS editors are all independent active scientific researchers, highly published in their respective fields of inquiry. ACS Publications supports more than 400 editorial offices at leading research universities and government-funded laboratories throughout the world to ensure the integrity, global reach and expertise of its peer-review process.” <http://pubs.acs.org/page/about-us.html>

**Nanotechnology** 2 articles as 1st author, IF: 3.8, Total cites: 34133 (#8 in Applied Physics), Articles: 1021 (#91), UK: “The journal aims to publish papers at the forefront of nanoscale science and technology and especially those of an interdisciplinary nature. Here, nanotechnology is taken to include the ability to individually address, control, and modify structures, materials and devices with nanometer precision, and the synthesis of such structures into systems of micro- and macroscopic dimensions such as MEMS based devices. It encompasses the understanding of the fundamental physics, chemistry, biology and technology of nanometer-scale objects and how such objects can be used in the areas of computation, sensors, nanostructured materials and nano-biotechnology. To be publishable in this journal, papers must meet the highest scientific quality standards, contain significant and original new science, and should make substantial advances within a particular area of nanoscale science and technology. Towards ensuring high editorial standards, every article submission is preliminarily assessed by the editors of the journal before being sent to independent referees. Articles can be rejected without refereeing after this initial assessment by the editors.” Nanotechnology is published by the Institute of Physics (IOP).

<http://iopscience.iop.org/0957-4484/page/Scope>

**Physical Review E** (PRE) 1 Article as 1st author, IF: 2.3, Total cites: 74169 (#1 Physics, fluids & plasma), Articles: 2451 (#19), USA: “PRE, broad and interdisciplinary in scope, focuses on collective phenomena of many-body systems, with statistical physics and nonlinear dynamics as the central themes of the journal. Physical Review E publishes recent developments in biological and soft matter physics including granular materials, colloids, complex fluids, liquid crystals, and polymers. The journal covers fluid dynamics and plasma physics and includes sections on computational and interdisciplinary physics, for example, complex networks.” PRE is published by the American Physical Society (APS).

<https://journals.aps.org/pre/about>

**Ultramicroscopy** 2 articles, 1 as 1st author, IF: 2.5, Total cites: 6126 (#1 in Microscopy), Netherlands: “Ultramicroscopy is an established journal that provides a forum for the publication of original research papers, invited reviews and rapid communications. The scope of Ultramicroscopy is to describe advances in instrumentation, methods and theory related to all modes of microscopical imaging, diffraction and spectroscopy in the life and physical sciences.” Ultramicroscopy is published by Elsevier.

<http://www.journals.elsevier.com/ultramicroscopy>

**Nanoscale** Reviewer, IF: 6.2, Total cites: 7835 (#19 in Nanoscience and nanotechnology), UK & China: Nanoscale is “a high impact peer reviewed journal publishing experimental and theoretical work across the breadth of nanoscience and nanotechnology. It is a collaborative venture between Royal Society of Chemistry Publishing and a leading nanoscience research center, the National Center for Nanoscience and Technology (NCNST) in Beijing, China. Since its launch in late 2009, Nanoscale has quickly established itself as a platform for high-quality community-spanning research which bridges the various disciplines involved with nanoscience and nanotechnology, publishing important research from leading international research groups.”

<http://www.rsc.org/publishing/journals/nr/About.asp>

**b) Non original publications (virtual journals) and book chapters**

**InTech** 1 book chapter as 1st author: “Intech is a pioneer and world's largest multidisciplinary open access publisher of books covering the fields of Science, Technology and Medicine. Since 2004, InTech has collaborated with more than 86447 authors and published 2366 books and 6 journals with the aim of providing free online access to high-quality research and helping leading academics to make their work visible and accessible to diverse new audiences around the world. Intech reaches 490000 unique readers per month.”

<http://www.intechopen.com/about-intech.html>

**Virtual Journal of Nanoscale Science and Technology** 2 articles as 1st author: “Featured here is an important subscription-based resource for obtaining science articles online. Wide-ranging institutional access as well as free services make this resources useful without an individual subscription. In addition, in January 2000, the American Institute of Physics (AIP) and the American Physical Society (APS) launched a new virtual journal. Representing the first entry in a series of journals the Virtual Journal of Nanoscale Science and Technologywill gather "into one spot all the papers on a given topic that appear in a wide range of premier physics-related journals." The articles have been pre-selected by expert editors, so that specialists may turn to this convenient resource to stay on top of cutting-edge research. Access to articles will require a regular subscription to the specific journals, though non-subscribers do have the option of purchasing individual articles for immediate online delivery. Browsing the tables of contents and abstracts is free.”

<https://scout.wisc.edu/archives/r5979/virtual_journal_of_nanoscale_science_and_technology>

**Microscopy and Analysis** 1 article as 1st author: “Microscopy and Analysis is the leading international journal for microscopists, with over 46,000 subscribers and 120,000 readers worldwide. The journal is distributed free of charge only to users who purchase, specify or approve microscopical, analytical and/or imaging equipment at their place of work, ensuring that your advertisement is only seen by those who have influence over purchasing. Microscopy and Analysis is published six times per year. There are three editions covering: Europe (EMEA), The Americas and the Asia/Pacific region. There are also several supplements published periodically, which include publications devoted to special events, trade shows and specific areas of microscopy. Print issues are also published as e-book.”

<http://www.microscopy-analysis.com/about-us>