

# **NSF/CISE -- US-Israel BSF International Opportunity Collaborative Proposals**



United States - Israel  
Binational Science  
Foundation

*Sol Greenspan & Jack Snoeyink*

CISE: Directorate for  
Computer & Information Science & Engineering  
NSF: National Science Foundation

# Want to tell you about these..

 United States - Israel  
Binational Science  
Foundation



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**Grant Programs**      **General**

**General**

Regular Research Grants

Eligibility

Split Program

Cooperative Research

Financial Terms

Submission Information

Start-up Research Grants

Transformative Science Grants

Prof. Rahamimoff Travel Grants

Call For Proposals

NSF-BSF Joint Funding Programs

Each year, the BSF offers grants in several scientific programs:

**Regular research grants**  
Open to all scientists from Israel and the USA who would like to conduct joint research in a variety of scientific research. Please verify your [eligibility](#) before submitting. Read more about the program [here](#).

**Start-up research grants**  
Open to American and Israeli scientists who are in the initial stages of their independent careers. Find more details [here](#).

**Transformative Science Research grants**  
A new program in 'Transformative Science' was launched in 2010. This is a small program of up to 2 awards annually that will receive larger grants than in our regular program. To be awarded a grant, the program must be 'transformative'. The BSF has adopted the NSF definition for 'Transformative Science', which is: **Research driven by ideas that have the potential to radically change our understanding of an important scientific concept, or lead to the creation of a new paradigm, or a new field of science. Such research is characterized by its challenge to current understanding or by its pathways to new frontiers.** Find more details [here](#).



[Simple Search](#)

[Advanced Search](#)

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## Advanced Search Results

You Searched For:

**NSF Organization** Direct For Computer & Info Scie & Engnrr

**Keyword** BSF

**Active Awards** true

**Expired Awards** true

Refined by

Refine Search

**State**

- Arizona(1)
- California(9)
- Connecticut(2)
- Georgia(3)
- Massachusetts(7)
- [Show More ...](#)

**Award Amount**

- Less than or equal \$50,000(20)
- Between \$50,001 - \$100,000(5)
- Between \$100,001 - \$500,000(16)
- Between \$500,001 - \$1,000,000(4)
- More than \$1,000,000(1)

**Award Instrument**

- Standard Grant(45)
- Continuing Grant(1)

Export up to 3,000 Awards:

Sort By:

Results size:

30 per page

Table  List

### [BSF:2012304:Methods for Preprocessing Population Sequence Data](#)

Award Number:1331176; Principal Investigator:Eleazar Eskin; Co-Principal Investigator:; Organization:University of California-Los Angeles; NSF Organization:CCF Start Date:09/01/2013; Award Amount:\$40,000.00; Relevance:77.8;

### [BSF:2012338:Shortest Paths: Upper and lower bounds](#)

Award Number:1330843; Principal Investigator:Virginia Williams; Co-Principal Investigator:; Organization:University of California-Berkeley; NSF Organization:CCF Start Date:09/01/2013; Award Amount:\$44,999.00; Relevance:77.8;

### [BSF:2012348:The Boundaries of Privacy](#)

Award Number:1331343; Principal Investigator:Katrina Ligett; Co-Principal Investigator:; Organization:California Institute of Technology; NSF Organization:CCF Start Date:09/01/2013; Award Amount:\$60,000.00; Relevance:77.8;

### [BSF:2012338:Shortest Paths: Upper and lower bounds](#)

Award Number:1417238; Principal Investigator:Virginia Williams; Co-Principal Investigator:; Organization:Stanford University; NSF Organization:CCF Start Date:09/01/2013; Award Amount:\$44,999.00; Relevance:77.8;

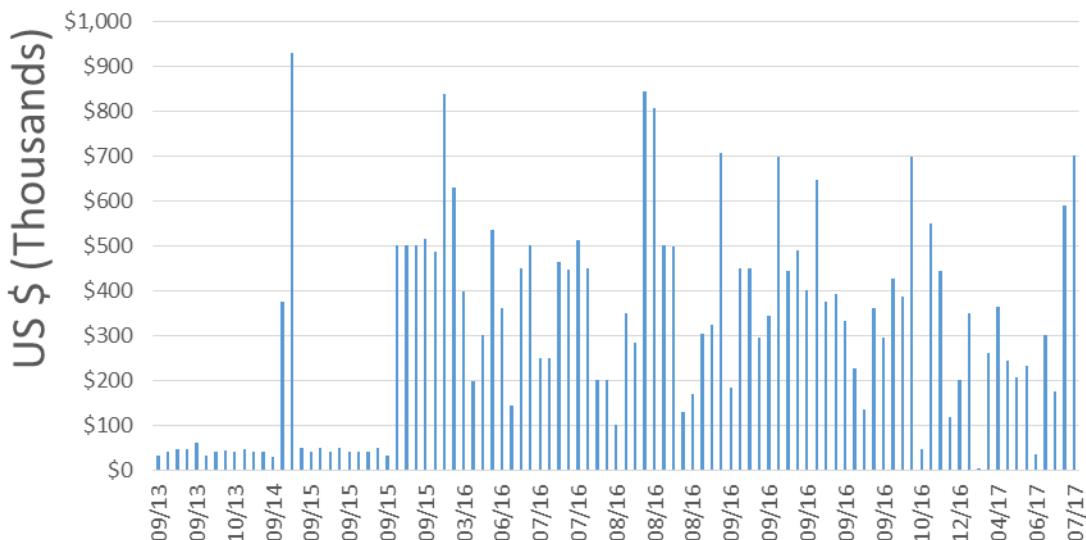
### [BSF:2012299:Efficient Algorithms for Geometric Optimization](#)

Award Number:1331133; Principal Investigator:Pankaj Agarwal; Co-Principal Investigator:; Organization:Duke University; NSF Organization:CCF Start Date:09/01/2013; Award Amount:\$32,843.00; Relevance:77.79;

### [BSF:2012139:Computing Structures Beyond Moore and von Neumann](#)

Award Number:1329374; Principal Investigator:Eby Friedman; Co-Principal Investigator:; Organization:University of Rochester; NSF Organization:CCF Start Date:10/01/2013; Award Amount:\$40,000.00; Relevance:77.8;

### [BSF:2012362:Parallel GPU Algorithms for Proximity Analysis of Freeforms](#)



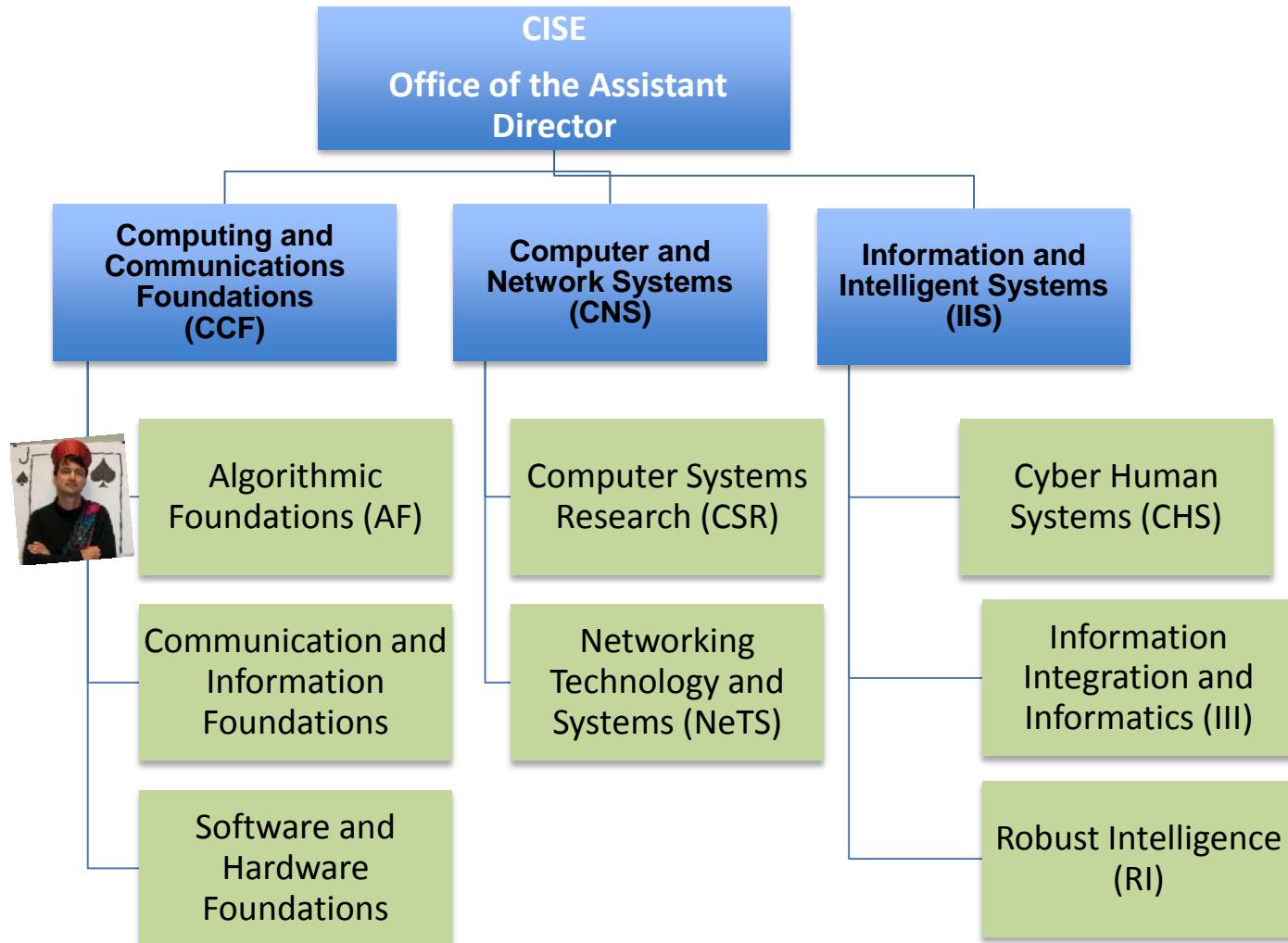
## NSF Awards to US PIs in collab with BSF

NSF Award Search:  
CISE awards with  
BSF in title/abstract;  
*bar = award*  
*height = amount.*

# Goal & Structure of the Program

- Goal: Increase collaboration between US & Israeli researchers
  - NSF funds US researchers (<\$500K/3 years in CISE)
  - BSF funds Israeli researchers
- PIs submit same proposal (body) to NSF & BSF
  - If recommended for funding by NSF, BSF will fund their part (no additional reviews; no “double jeopardy”)
  - BSF allows simultaneous submission (as regular grant); NSF does not.
- Instruction links:
  - Special, CISE Dear Colleague Letter (DCL) [NSF 17-020](#)
  - General, Policy Guide (PAPPG) [NSF 17-1](#) general
  - BSF site: [NSF-BSF Joint Funding Programs](#)
  - BSF: [Tips for Israeli applicants to NSF/BSF](#)

# CISE Core Programs



CISE Cross-Cutting Programs: eg.

Secure and Trustworthy  
Cyberspace (SaTC)

# Participating NSF CISE Solicitations

*Submission window for Small proposals: **01 - 15 Nov 2017***

- *Secure and Trustworthy Cyberspace (SaTC) Program, since fall '14*  
Solicitation [NSF 17-xxx](#) (to appear)    Prior year [NSF 16-580](#)
- *Computing & Communication Foundations (CCF) core, added fall '15*  
Solicitation [NSF 17-xxx](#) (to appear)    Prior year [NSF 16-578](#)
- *Computer & Network Systems (CNS) core, added fall '16*  
Solicitation [NSF 17-xxx](#) (to appear)    Prior year [NSF 16-579](#)

*Success rates about 20%*

- *Information & Intelligent Systems (IIS) core, added ?*  
Solicitation [NSF 17-xxx](#) (to appear)    Prior year: [NSF 16-581](#)
- Watch for update to Oct '16 DCL: [NSF 17-020](#), and [BSF news](#).

follow  
instructions  
carefully

# What to do...

**Tell your story...**



# NSF Reviewers see Israeli team details in “Supplemental Docs”

- Authorization to share proposal & reviews
- Bio sketches for Israeli collaborators
- Budget for Israeli collaborators
- Collaboration Plan: joint document

# What to do...

follow  
instructions  
carefully

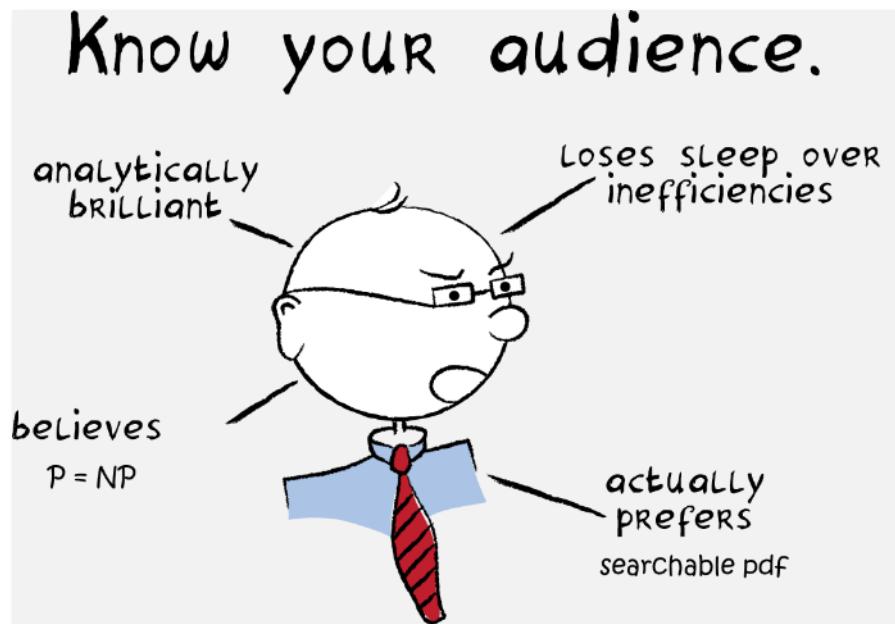
Tell your story...

Know your audience.



# Know your audience

- Smart people, willing to serve their community
- Busy people, reviewing 7-10 proposals, knowing that the majority will not get funded
- People from diverse research areas in a program



## What you can do:

- Ask colleagues to read your proposal
- Suggest reviewers in your proposal
- Volunteer to serve on a panel

# What to do...

follow  
instructions  
carefully

Tell your story...

Know your audience.



# The NSF Review Criteria

- NSF programs assemble panels of experts to review proposals for its programs
- Proposals with “BSF” in the title are reviewed with other proposals in the targeted program(s)
- Panelists use standard NSF Merit Review criteria
  - Intellectual Merit
  - Broader Impacts
  - Solicitation-specific criteria
- Also comment on:
  - Description of the collaboration with Israel
  - Roles of both US and Israeli collaborators



# Standard NSF Evaluation Criteria:

## Intellectual Merit

- Importance of proposed research
  - to advance knowledge and understanding
  - within the field and across fields
- Creativity and originality
- Significance of expected contributions
- Qualifications of the PIs
- Access to necessary resources
  - Students, equipment, facilities, etc.



# Standard NSF Evaluation Criteria

## Broader Impacts

- Benefits to society and the nation(s)
- Benefits to the field and to other research fields
- Broad dissemination of tools, methods, data, results, and outcomes
- Integration of research and teaching, training, and learning
- Broadening participation of underrepresented groups and creating diversity in the computer systems workforce,
  - e.g., gender, ethnicity, disability, geographic, etc.
- Linkages to technology transfer opportunities
- Outreach to community, region, organizations where research outcomes (e.g., knowledge) can be shared in valuable ways

Examples,  
not a checklist!

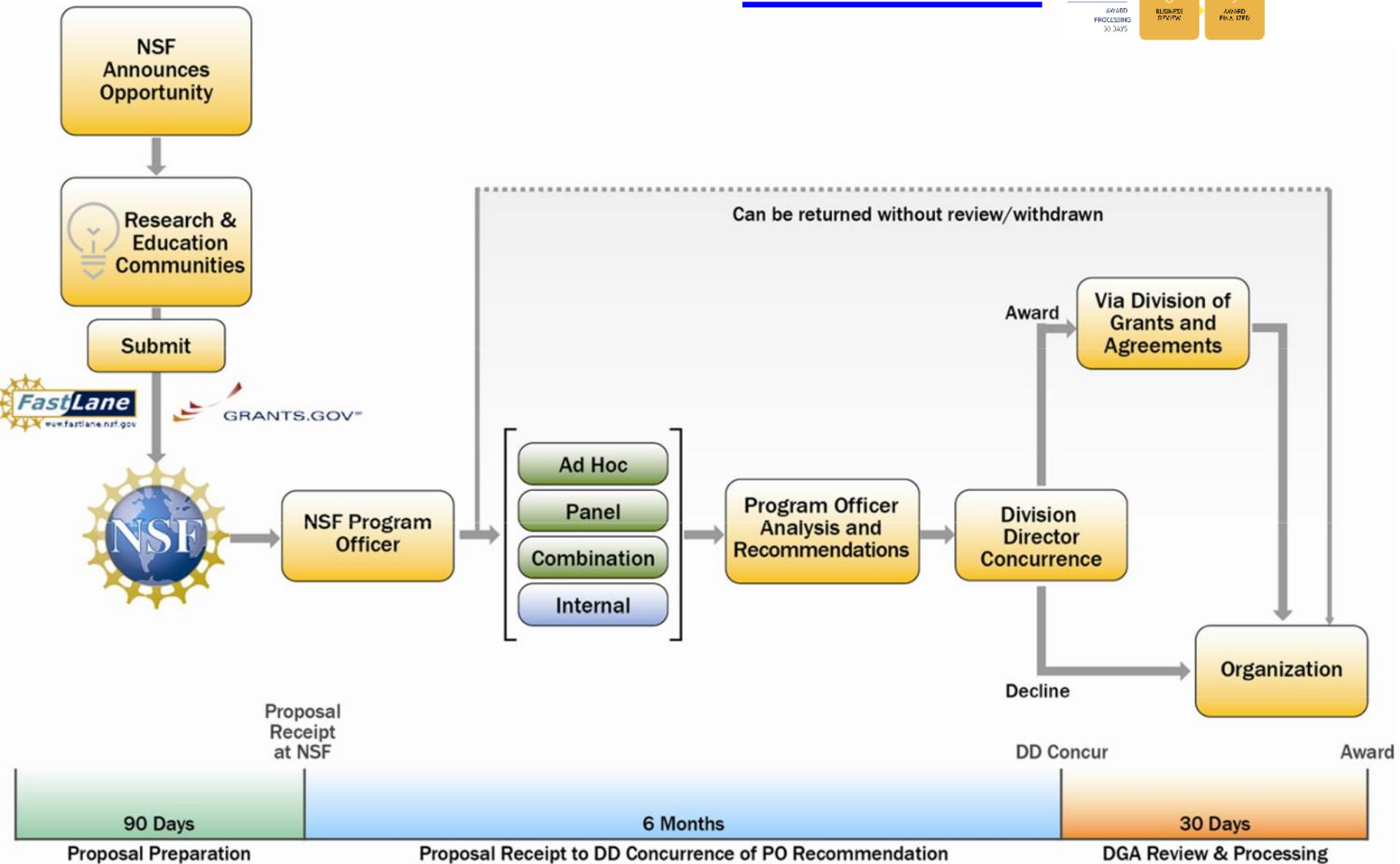
Don't need all, but  
want creative novelty  
in significant impacts.

Important to US side;  
Israeli impacts help.

## Standard NSF Evaluation Criteria: Solicitation-Specific Criteria

- Core programs have no specific criteria except submit matter scope.
- Secure and Trustworthy Cyberspace (SaTC) checks that the topic is in scope and not a good fit for one of the Core programs.
- For NSF-BSF, the appropriateness of collaboration is considered: the whole should be greater than the sum of the parts.

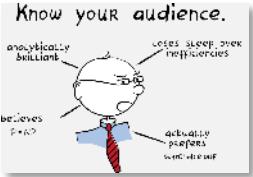
# Merit Review Timeline



## Proposal Writing Tips

- Explain the importance of the problem area, as if it were not obvious to the reader. Not only technically sound, but important!
- NSF considers both the Project and the People
  - PI capabilities are important, but the PI track record alone is not sufficient to merit new funding
  - The project description must give sufficient detail to understand the research activity and believe it is worth investing in it
- The scope of new/original work needs to be clear vis-à-vis related work by others and prior work of PIs
- Top 10 list of what to avoid...

# Number 10: Fonts Too Small



follow  
instructions  
carefully

- Small fonts promote reader fatigue
  - Reviewers HATE small fonts
  - PAPPG mandates:
    - 11 point font minimum
    - 1 inch margins
    - 6 lines max per vertical inch

The redundant information sent by a node on its different edges also introduces a dependency between the queues of the nodes that are not even neighbors. The later complication, while true for RLC, does not inflict itself on every scheme. For example, a routing scheme with feedback on a general network [58] does not suffer from this complication. However, unlike RLC, it is not throughput optimal. Finally, the intractability of the EMC is compounded by a non-memoryless output process at each node. Thus, approximation is a more favorable option.

We propose an approximation method that updates a state-space model imposed by the next-hop neighbors  $N^+(u)$  (on the packets departing from  $u$ ), and the state transition probabilities of the queue for each node  $u$  to the state of the queues corresponding to nodes in  $N^+(u)$  and  $N^-(u)$ . Note that this will be exact for most of the schemes on a general network as well as when RLC is applied on a line network<sup>5</sup>. The main idea of the approximation framework is to divide the multi-dimensional MC with multiple reflections into multiple simple MCs whose steady-state probabilities can be calculated independently. Note that although each MC process is assumed independent of the other MC processes, the interdependency of the states of their queues are captured by the approximation method via their steady-state probability distributions. In the procedure, we also wish to define the minimal set of queues required to determine the performance parameters. In a given node  $u \in V$  and a subset of nodes  $S \subset V$ , consider the queue

in that similar to the one depicted in Fig. 4. Given  $\lambda_{j,n} = \lambda_{n-1}, \dots, \lambda_{j+1}$ , we can define its arrival and departure polynomials as

$$A^{(n_0)}(x) = \sum_{k=0}^{z_{n_0}} a_k^{(n_0)} x^k = \sum_{j=1}^{z_{n_0}} (\overline{\lambda_j(n_0)} + \lambda_j(n_0)x), \quad E^{(n_0)}(x) = \sum_{k=0}^{z_{n_0}} e_k^{(n_0)} x^k = \prod_{j=1}^{z_{n_0}} (\overline{\mu_j(n_0)} + \mu_j(n_0)x),$$

where  $\lambda_j(n_0)$  is the probability of the event that the number of arrived (and departed) individuals is  $j$  at time  $n_0$ . The superscript on the coefficients

where  $a_k^{(n_0)}$  ( $a_{k'}^{(n_0)}$ ) can be interpreted as the probability of the event that the number of arriving innovative packets to (from) the queue  $X_{n \rightarrow k}(t)$  is equal to  $k$ , in an epoch. The superscript on the coefficients represents the current state  $X_{n \rightarrow k}(t) = n_0$ . We included this dependency of the arrival and departure polynomials on the current state of queue to account for some cases such as the wireless networks with backpressure routing in Section 3.2. Let  $\Delta_{n-S} = \{A^{(n_0)}(x)\}_{m=0}^{m_0}$  and  $\Gamma_{n-S} = \{E^{(n_0)}(x)\}_{m=0}^{m_0}$  be the sets of arrival and departure polynomials for the queue  $X_{n \rightarrow S}(t)$ , respectively, where  $m_0$  is the buffer size of node  $n$ . Given  $\Delta_{n-S}$  and  $\Gamma_{n-S}$ , the queue's state transition probabilities can be easily computed. As an example, for  $0 < j < m_0$ , we have the following:

For notational consistency, we can extend  $e_k = 0$  for  $k < 0$  or  $k > z_{\text{out}}$  and  $a_k = 0$  for  $k < 0$  or  $k > z_{\text{in}}$ . Note that the above equation is slightly different for  $j = 0$  and  $j = m_n$ , whose details are omitted due to the page limit. As a result, the proper approximate MC is formed for  $X_{n-1}(t)$  with steady-state probability distribution  $\pi_{n-1}(x)$ . Then, we can still get all the information for the problem, for any node  $n$ ,  $u$  (or multiple) queue with its incoming traffic  $\lambda_u$ . Then, the corresponding arrival and departure polynomials will be obtained by shifting the queue from which the steady-state probability distribution  $\pi_{n-1}(x)$  is derived.

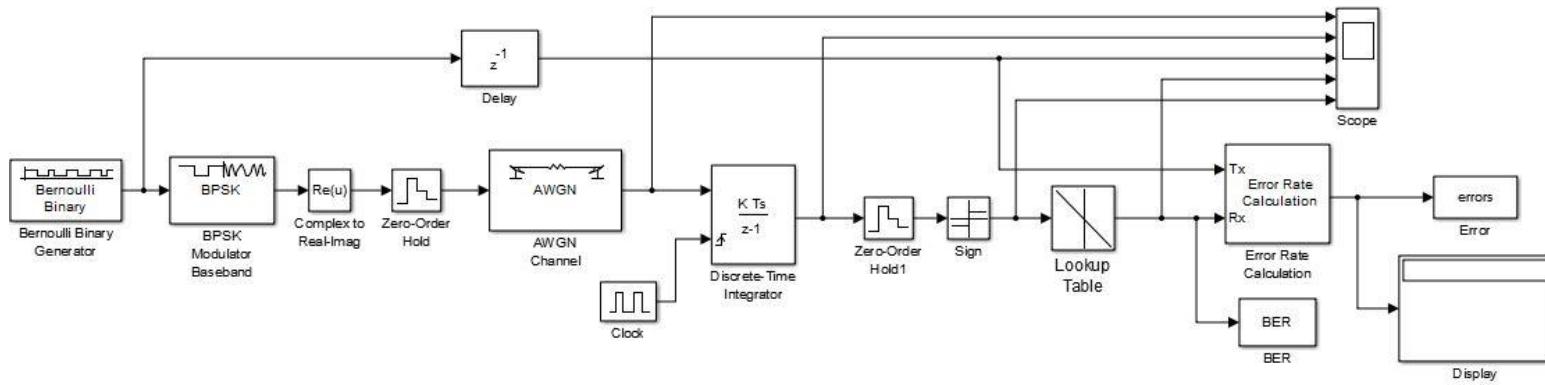
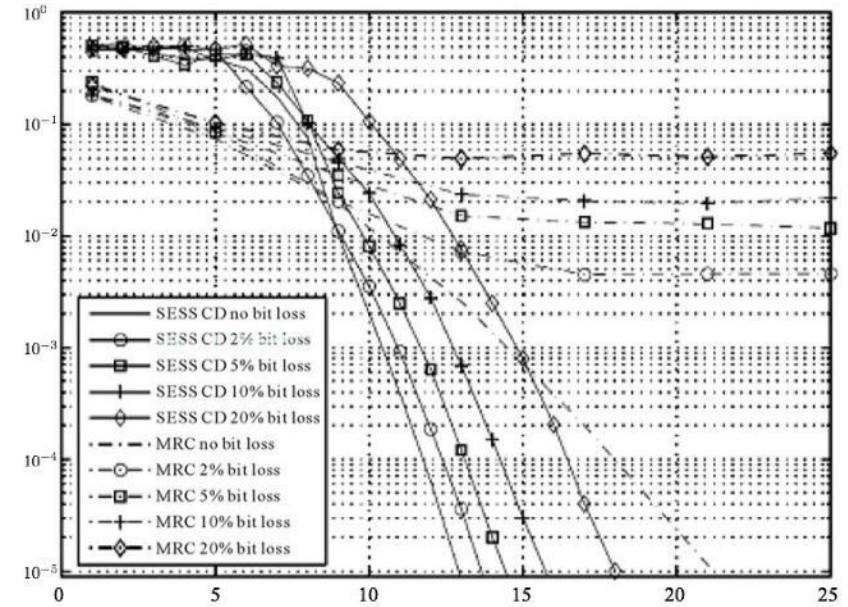
In summary, given all the information about the network and the traffic requirements, the corresponding state transitions of the queue from which the probability distribution can be computed for the MC. Then, we propose the following algorithm, denoted as the "Iteration Estimation Algorithm" (IEA), to compute steady-state probability distributions for all queues:

<sup>5</sup>Section 3.1 presents an improved approximation for  $\hat{F}_n$ .

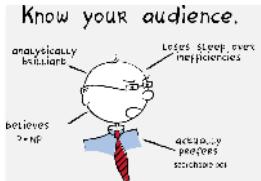
# Number 9: Figures Illegible



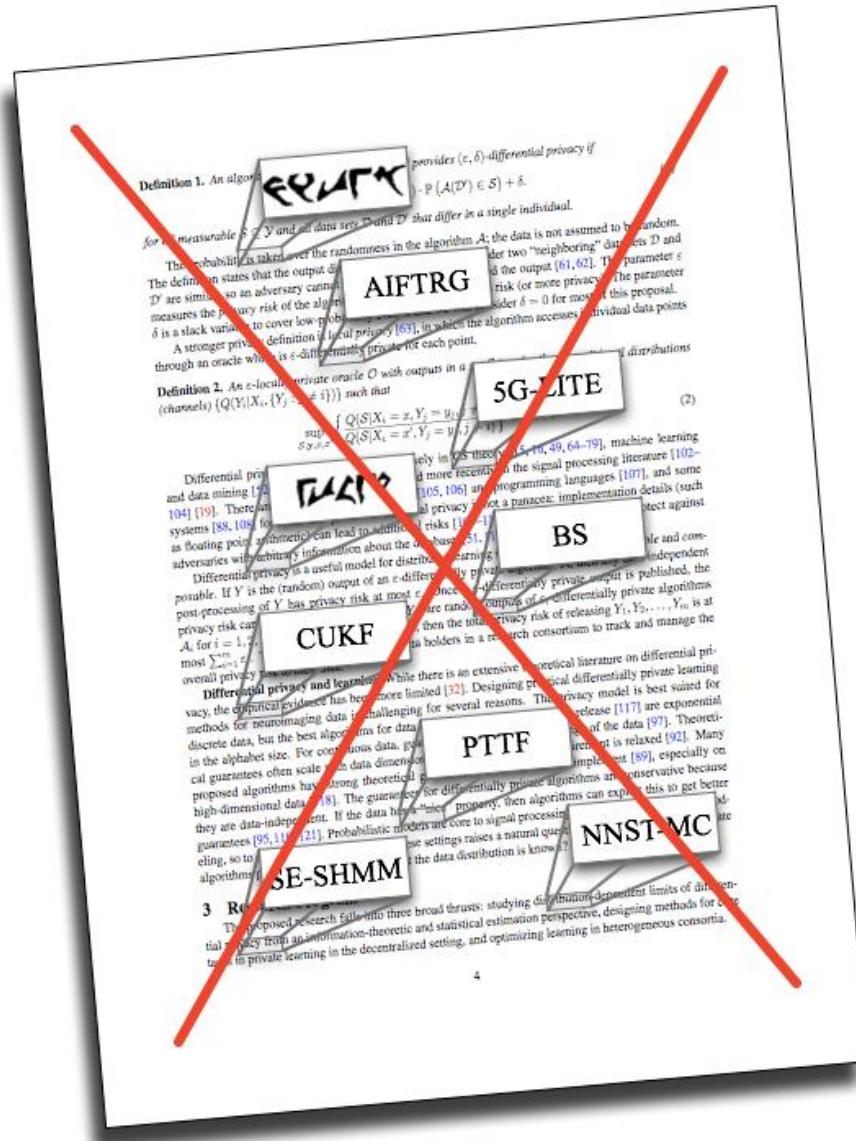
- Avoid “crowded” visuals
- Don’t assume reader will print in **color**
- Use vector graphic formats



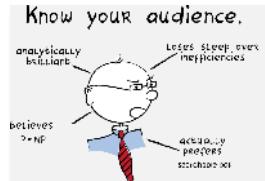
# Number 8: Acronyms



- Acronyms are **UGLY**, and make text hard to read.
- Acronyms limit your audience to those who already know them...



# Number 7: Dissing the Competition



- Good idea: Citing others' work
- Bad idea: Slighting others' work



("Others" might be sitting on the panel)

# Number 6: Poor distinction between preliminary results and proposed work

- Make a clear demarcation
- Distinguish your results from others'
- Provide clear road map for future work



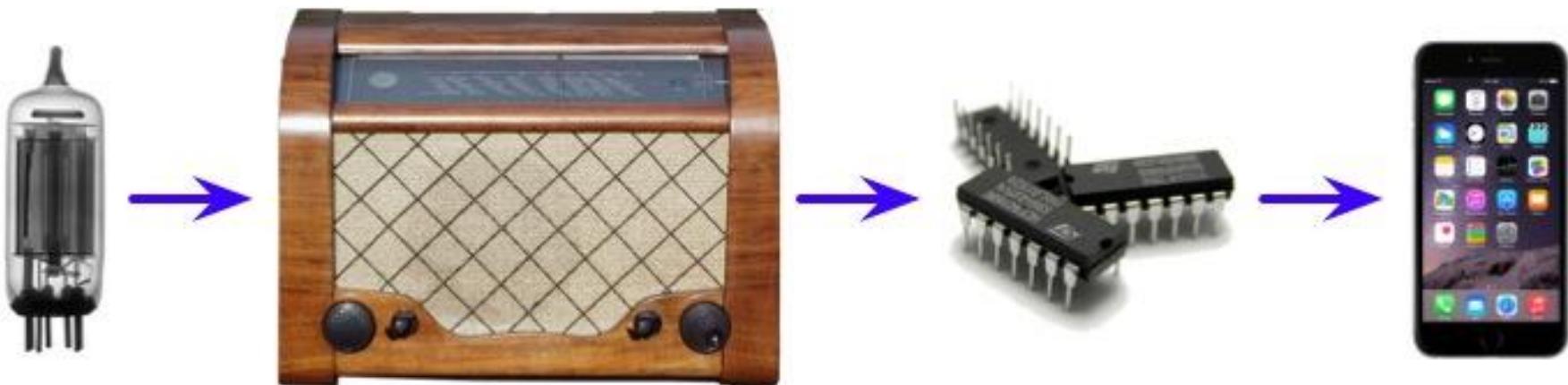
# Number 5: Lackluster Education Plan

- Should be integrated with research plan
- Think **beyond** your present teaching duties



# Number 4: Dull Broader Impacts

- Broader Impacts ask:
  - How will this work change society?
- Don't confuse this with “extracurricular activities” not supported by the research plan
- Outreach plans should be substantiated



# Number 3: (for new Pis)

## Confining yourself to your PhD work

- Proposals should be forward-looking
- Move above and beyond your PhD work
- “Imagine a world ...”



(yes)



(no)

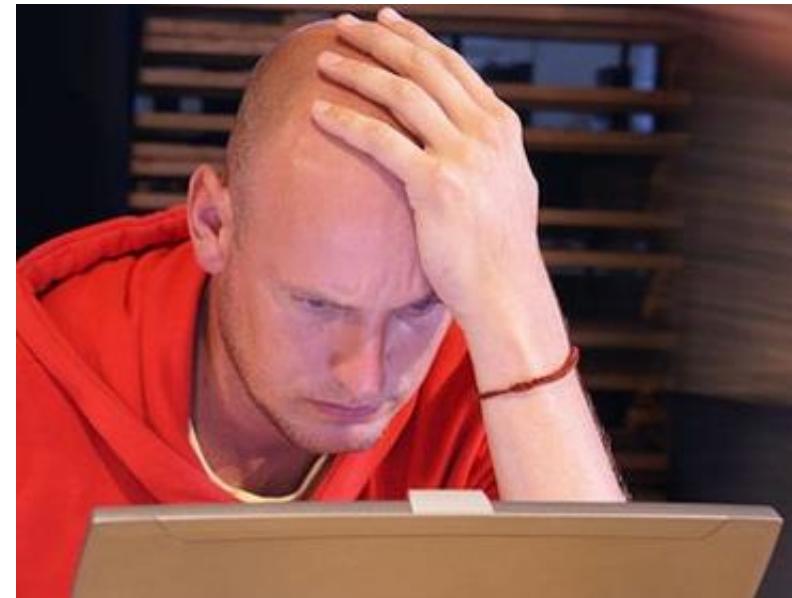
# Number 2: “It wasn’t clear ...”

## Symptoms:

- Long-winded explanations
- Too many superfluous details
- Poor organization of thoughts into words

## Remedies:

- Use fewer words
- Read first two pages aloud
- “Make every word tell”



# Number 1: Research Plan lacking Cohesion

- Don't staple together unrelated ideas
- Don't offer a laundry list with no prioritization
- Don't make everything look like a nail to your one hammer
- Tell a story with your narrative

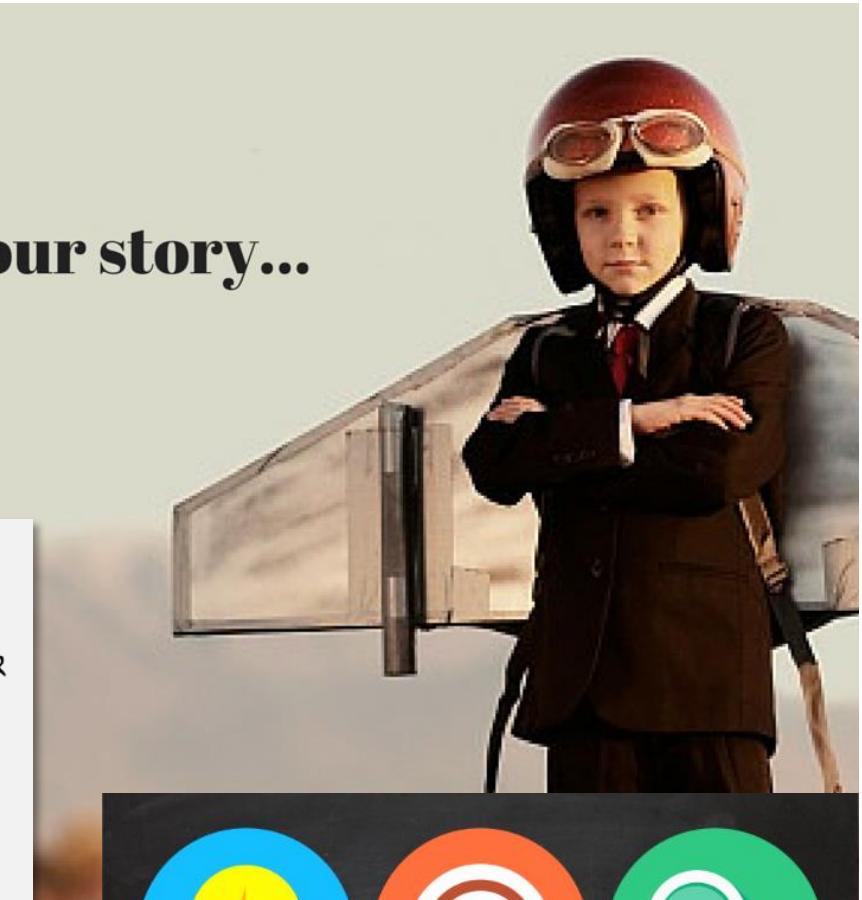


# What to do...

follow  
instructions  
carefully

Tell your story...

Know your audience.



# Jack's favorite writing exercises

5 rules for good writing:  
write, rewrite, rewrite,  
rewrite, rewrite.

Context first ([Gopen and Swan](#))

Underline verbs: active, passive, being

Consider rewriting if half are being or passive.

Find parallelism and strengthen it

Scratch out words without changing meaning



# Acronyms

NSF: US National Science Foundation

BSF: US/Israel Bi-national Science Foundation

TLA: Three-letter acronym

CISE: Computer and Information Science &  
Engineering Directorate of NSF

CCF: Computing & Communication Foundations  
Division of NSF CISE

DCL: Dear Colleague Letter – gives information  
about NSF programs or priorities