

*The Stanford Statistics Songbook*

Matthew Finkelman, Giles Hooker, Armin Schwatzman

## Stats Songs: A Musical Tribute

### From the Sequoia Christmas Party 2003:

*This is a story about being a grad student in the Stats department at Stanford. What is the first year like?*

#### ***A Hard Study Night*** (Hard Day's Night)

It's been a hard study night, and I've been working like a dog  
It's been a hard study night, even when sleeping I take the log  
Cause I got homework to do, have weak convergence to prove  
pages of formulas to write

You know I work all day to figure out all these crazy things  
And it's worth if I can get an A  
My dad will give me everything  
So why on earth should I moan, 'cause with these old solutions  
300 is a piece of cake

When in class everything seems to be right  
When I'm home, nothing makes sense, I feel tight, tight

It's been a hard study night, and I been working like a dog  
It's been a hard study night, even when sleeping I take the log  
But why on earth should I moan, 'cause with these old solutions  
300 is a piece of cake

#### ***Eight Days a Week***

**D#**

Ooh I need S-plus babe,  
Got to strap a boot.  
It will take ten hours, babe  
If I use a loop  
Code it, solve it, show it, prove it.  
Ain't got nothing but homework,  
Eight days a week.

Theorems every day girl,  
Always on my mind.  
Got to keep on working,  
Or else I'll fall behind.  
Code it, solve it, show it, prove it.  
Ain't got nothing but homework,  
Eight days a week.

Eight days a week, with homework.  
Eight days a week  
Is not enough to absorb Durrett.

Theorems every day girl...

Eight days a week ....

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*Yes, we work hard, and we struggle with difficult concepts, like Bayesian theory.*

***I got you Bayes*** (I Got You Babe)

**C**

They say that your assumptions are strong,  
You have your critics, but I know you can't be wrong.  
Well I don't know if your prior is true  
but you got me, and Bayes-ie I got you.

Bayes, I got you Bayes, I got you Bayes...

Minimize average risk,  
I can't stand frequentists.  
When the prior's bad it might let you down,  
But do not get scared Persi's always around.

**G G#**

**C#**

You're so easy to learn, you're so easy to see  
Unless you're taught from chapter 4 TPE  
We'll never forget you, never at all,  
At least until after we finish the quals.

*And eventually, there is the culmination of the first year.*

***Here Come the Qualls*** (Here Comes the Sun)

**D**

Little first year, it's been a long and lonely summer  
Little first year, it's been one year that we've been here  
Here come the quals, here come the quals  
And I say it's all right

Little first year, the amount to study is overwhelming  
Little first year, it will be years 'till you leave here  
Here come the quals, here come the quals  
And I say it's all right

Qualls, quals, quals, here they come...  
Qualls, quals, quals, better run...

Little first year, I feel my brain is slowly melting  
Little first year, it seems like years since it's been clear  
Here come the quals, here come the quals  
And profs say "That's all wrong".

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*If everything goes well, we move on to the second year. Then we have no idea what to do, but we have to keep ourselves busy with something. For example, we teach. Here's a song to sing to the undergraduates on the first day of Stat 60 section.*

### ***I Want to Teach You Stats*** (I Want to Hold Your Hand)

**C**

Oh yeah, I'll teach you something,  
I hope you'll understand.  
Let's start testing something  
I want to teach you Stats, x 3

Oh please, say to me  
If you don't understand  
And please, don't fall asleep  
Just please raise your hand.  
Now let me see your hand,  
Come on and raise your hand.

And when I teach you, I feel happy inside.  
It's such a feeling to feel smart  
I can't hide, I can't hide, I can't hide.

Yeah, you, please ask something,  
How much math can you stand?  
Let's now estimate something  
I want to teach you Stats. x 3

*No wonder nobody asks anything. We do the same thing when we go to class. What are we thinking about while sitting there in the classroom?*

### ***X-Y-Z, Theta-Pi*** (Obla Di Olba Da)

What proof is he doing on the board today?  
All I know is I don't understand  
I can't read his writing, but what can I say?  
I'm much too timid and I'll never raise my hand

x-y-z, theta-pi, class goes on, brah!  
La-la-la-la, class goes on

In a couple of years they have built a theory, nice theory  
With a couple of kids running in the back  
the grad students doing the work.

Happy is the master that we call the prof.  
Long live my superior advisor  
I can't understand him, but I do my job  
I'm much too timid and I'll never say a word

x-y-z, theta-pi grad school rocks, brah!  
La-la-la-la, grad school rocks!

And if you want some fun, take x-y-z-mu-pi

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*We keep ourselves busy too by doing consulting. We feel good because people need us. They come to us from all over campus screaming...*

**Help!**

**C**

Help, I need somebody,  
Help, a student, anybody,  
Help, I need some help with Stats, help!

When I was doing my experiment today  
I never needed any kind of help from my TA  
but now the survey is done, and I don't feel so sure  
how to find the regression line, significant predictors

Help me if you can, I'm feeling drowned  
And I do appreciate your drop-in hours.  
Help me get my data figured out,  
Won't you please, please help me.

I need your expertise, but I don't want to pay  
And my design is flawed in oh so many ways  
But I can't find Sequoia, and I don't know what to do  
Oh here it is, this must be it: a building called SEQ!

Help me if you can...

*The third and fourth year roll by and at some point we have to do some work. That's when we run up against the department's computing resources.*

**Miller** (Cecelia)

Miller, you're breaking my heart  
You ruin my work almost daily  
R.G. Miller, I'm down on my knees  
I'm begging you please to be up, come on up

Working hard in the afternoon  
Simulations in my office room  
Suddenly the screen goes blank  
Naras tells me it crashed, will be down for 3 days

Miller...

Jubilation! It's running again  
Maybe this old machine still has use  
Jubilation! It's running again  
Now I need another excuse... not to work

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*But our experience would just not be the same if we didn't have our wonderful secretaries.*

***Let Me Eat*** (Let It Be)

When I find myself in times of trouble  
Mother Helen comes to me  
Speaking words of wisdom, in Greek.  
And in my hour of hunger  
She has always an extra cookie  
Right before the seminar, a cookie.

Let me eat, let me eat, let me eat, let me eat.  
Don't care about the seminar, let me eat.

***Hey Judi*** (Hey Jude)

Hey Judi, I've been so bad  
I turned the heat on in the PC room  
I rigged up the radiators to creak  
And stole from the fridge all the party food

Hey Judi, I'm so afraid  
Didn't show up to give my section  
I once was a good choice for student rep  
But now I'm facing a recall election

And anytime work is a pain, I just refrain  
I'm in my twelfth year and getting older  
And by the time I graduate, I'll get a date  
And hell will be truly frozen over

Hey Judi, I've been so bad  
I turned the heat on in the PC room  
I rigged up the radiators to creak  
And stole from the fridge all the party food

Na-na-na... hey Judi

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*Years of frustrating research may pass, but despite it all, the hard works eventually pays off. How exciting, we might be able to graduate after all! We have results!*

*Truly, we are very happy to be part of this department. Being in statistics is great. Everybody is talking about it. It is the field of the future.*

***It's .05 (My Boyfriend's back)***

**G**

The p-value's low and I'm gonna get it published  
Heh-na, heh-na, it's .05

The p-value is low and the journal isn't rubbish  
Heh-na, heh-na, it's .05

Yeah, my paper got accepted  
Null hypothesis rejected  
Heh-na, heh-na, it's .05

The effect is microscopic but I got four thousand patients  
Heh-na, heh-na, it's .05

Now people will forget my bad TA evaluations  
Heh-na, heh-na, it's .05

Yeah, my paper got accepted  
Null hypothesis rejected  
Heh-na, heh-na, it's .05  
Heh-na, heh-na, it's .05  
Heh-na, heh-na, it's .05

***Give Stats a Chance (Give Peace a Chance)***

Everybody's talking about  
Classification, estimation, information, validation,  
Integration, derivation, expectation, deviation  
All we are saying is give Stats a chance

Everybody's talking about  
Simulation, computation, transformation, model selection,  
linear regression, ridge regression, spline regression,  
logistic regression  
All we are saying is give Stats a chance

Everybody's talking about  
Univariate, multivariate, distribution, convolution  
Maximizer, minimizer, analyzer, optimizer  
Databases, smoothing bases, wavelet bases,  
So amazing!  
All we are saying is give Stats a chance

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**Stats Songs Continued**

From the Departmental BBQ 2004:

*These songs are longer and less thematically tight – the result of having a thesis to write. This one was started in a 2nd floor office early one morning.*

***Sequoia's Silence (Sounds of Silence)***

**Cm**

Hello Miller my old friend,  
I've come to work on you again.  
Because an idea that I must flaw  
Was told to me by my advisor,  
And the program that is now making you chug  
Has a bug,  
Within Sequoia's silence.

It's morning time and I'm alone,  
Even Lai has gone on home.  
'Till 10 o'clock the halls upstairs will be  
With offices completely empty.  
While downstairs, Helen fills the coffee pot  
There's not a lot  
To break Sequoia's silence

The conference deadline is next week  
I'm working out how I can tweak  
My results so that they look convincing  
And get them through the refereeing.  
No one's around to ask me for advice,  
That's kind of nice  
I like Sequoia's silence.

Things that I do not know;  
My office hours seem to show.  
Come to me and I will teach you  
All the things a Chi-squared can do.  
But my words, like strange Greek letters fell  
Who can tell  
What breaks Sequoia's silence.

And the students bowed and prayed  
About the problem sets I grade.  
Some bitch about how much I marked wrong  
Some wonder where these tests all came from;  
I just say "The pictures of past profs are hanging on the lounge room walls."  
Then evening's fall  
Brings back Sequoia's silence.

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*We all know where power rests in our department. This is a tribute to a fan of the Grateful Dead. (Judy Grey served in the department from the 1960's up until the 2000's)*

***Touch of Gray (Touch of Grey)***

**G**

Admit committee's forming,  
Applications running late  
GREs not yet collected  
Might be phony.

Peoplesoft is everywhere  
Lots of courses, no time spare  
Can't make entries, I don't care  
'Cause, it's all right.

And time goes by, and students cry  
Miller will die, I will survive

I see you've got your forms out.  
Now I'm going to talk about  
The baseball game I saw last week.  
It's all right.

Central Admin is all fools!  
That just lets me bend the rules;  
Every Stat degree has got a  
Touch of Gray.

Don't ask me why, don't even try,  
I'll get it by, you will survive.

And it's a pleasure to me,  
Weekends in Santa Cruz at the Beach;  
A wedding whim out in Reno  
Helen's party's, ready to go.

The summer sun is on the trees,  
Sit and smoke beneath the leaves,  
Talk to who-ever you please  
And it's all right.

Oh well a Touch of Gray  
Suits Sequoia anyway  
And we know she's here to stay  
And it's all right.

And time will fly, old Sequoia died  
Finances slide, She has survived.

We will get by, we will get by  
We will get by, we will survive.



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*Think of this as a plea to the gods:*

### **Graduation** (Mercedes Benz)

**C**

Oh Naras, won't you buy me a new Pentium?  
EEs all have laptops, we must make amends.  
Worked hard on my research it's time to defend.  
So Naras, won't you buy me a new Pentium?

Oh please, can we purchase a new projector?  
These two keep dying, they're starting to blur.  
All the faculty seem to concur.  
We're embarrassed each time there's a new visitor.

Oh Trev, can you find me and internship please?  
I need cash this Summer, the rent is a squeeze.  
I'm at the affiliates day, down on my knees,  
Just so I don't end up out under the trees.

Oh lord, won't you find me a thesis topic?  
I've lots of ideas which don't seem to fit.  
For each one I'll spend hours programming it;  
The theory all looks nice, but in practice it's shit.

Oh Judi, please process my graduation!  
I have all the forms here, it won't take too long.  
My job is awaiting, so before it goes wrong,  
Judi, please process my graduation!

*This one is self-explanatory but it was inspired by Weird-Al Yankovic.*

### **The Bootstrap Begins (American Pie)**

**C**

Long long time ago,  
Ingram can still remember when  
ANOVA used to be the thing.  
Small samples were all that we had  
And of the Normal we were glad  
And we all said R.A. Fisher was our king.  
But my data would never fit,  
No matter how I transformed it.  
Significance was too low;  
I did not know where to go.  
My referees all called it "crap",  
When a thought hit me with a slap:  
"You should try out the bootstrap."  
That's how I got published.

CHORUS (slow):

My, my, this assumptions a lie,  
But if we bootstrap we can use it and the paper will fly.  
We'll resample and kiss the normal goodbye  
Singing "Theory is too hard for this guy".

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Well Tukey in the olden days  
Used to sing the Jack-knife's praise  
'Though no-one knew exactly what it did.  
Mann and Whitney and Signed Ranks  
Received our non-parametric thanks  
When non-normality could not be hid.  
But if the data was over-dispersed  
And transforms seemed to make it worse:  
The Chi-squared wouldn't work  
The doctors went berserk!  
But Brad told us to resample,  
A few hundred times should be ample;  
Use the histogram empirical  
We'll call that the bootstrap.

CHORUS

Do you know that our confidence  
Can be put in places that make sense  
Even when the distribution is unknown?  
Do you have processing power  
To run this scheme within an hour  
And find a result that's not yet been shown?  
Any applied statistician  
Will almost always say "I can!"  
What ever task you bring  
"We'll bootstrap anything."  
A distribution we can plot  
For any statistic you've got;  
You've stepped into the perfect shop  
Here's the best thing on the lot.

CHORUS

Twenty-five long years have come and gone  
Since Efron's idea came along  
And now you see it everywhere.  
With computers now so very fast  
Simulation is a blast  
And for all that theory we don't really care.  
Though Donoho still rails away  
At the lack of rigor found today;  
Models are complicated,  
Distributions are not stated.  
And though there is no guarantee  
That the truth is what we'll see,  
When consulting comes to me  
I'll still say "Let's bootstrap".

CHORUS (x2: soft then fast)

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**Miscellany**

*This one was submitted as the back page of Giles' thesis; Armin gave the first public performance at the 2004 Christmas party.*

***I'm Graduating In the Summer (I'm Getting Married in the Morning)***

I'm Graduating in the Summer,  
Doctoral glory will be mine!  
Congratulate me,  
Publish and fête me,  
But get my thesis in on time!

Reading committee is assembled  
Making corrections line by line.  
But they're still waiting  
While I'm procrastinating.  
Just get my thesis in on time!

If I am sleeping, come get me up!  
If I am dozing, someone fill my coffee cup!

I've got to submit by September,  
Work that is worthy of my prime.  
And though I try writing,  
The web is so inviting  
I think I'll look up news this time.

Sun's shining brightly on the Oval,  
Staying indoors is just a crime!  
But I'm still lurking,  
These halls, and still not working  
To get my thesis in on time!

They're playing frisbee: pull down my blind,  
I'm at a party; tell me not to waste my mind.

And hopefully:

I'll have graduated in the summer,  
Answering to 'doctor' seems so fine!  
And any letter from me  
Will finish with 'PhD':  
I'll have my thesis in,  
I'll have my thesis in,  
At long last I'll have my thesis in on time.

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*Giles wrote this one since graduating. As Armin commented, "It's interesting to see what you're thinking about these days."*

***Negative Binomial (Blowing In the Wind)***

Oh how many times can I teach intro stats,  
Before my lecture slides are dead?  
Yes 'n' how many examples must I do on the board,  
To get ANOVA into their heads?  
Yes, 'n' how many years can I set this homework  
Before solutions are on the web?  
The answer my friend is negative binomial,  
The answer is neg. binomial.

And how many papers must faculty publish  
Before they get given tenure?  
Yes, 'n' how many grants must they apply for  
Before their summer salary is sure?  
Yes, 'n' how many applied articles must go out  
Before Annals takes one that is pure?  
The answer my friend is negative binomial,  
Or since 'n' equals one, geometric.

And how do I test if its better for me  
To publish or do consulting?  
And should I write software or do more theory,  
which brings in the most financing?  
And what's the politics when I'm on committee  
And money needs allocating?  
The answer dear prof, is nothing is normal,  
The answer is non-parametrics.

*Lyrics written by  
Armin Schwartzman, Matthew Finkelman and Giles Hooker  
Stats BBQ, May 23, 2004*