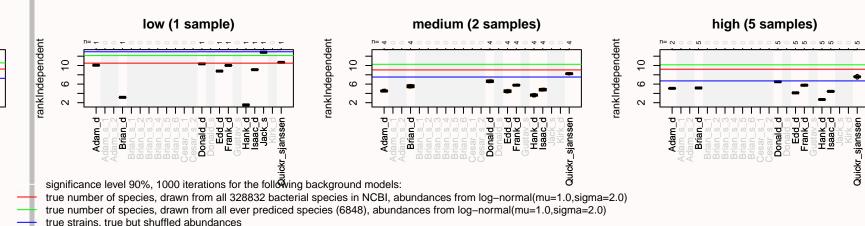
# across all 3 datasets

## Toy competition, metric: Unifrac

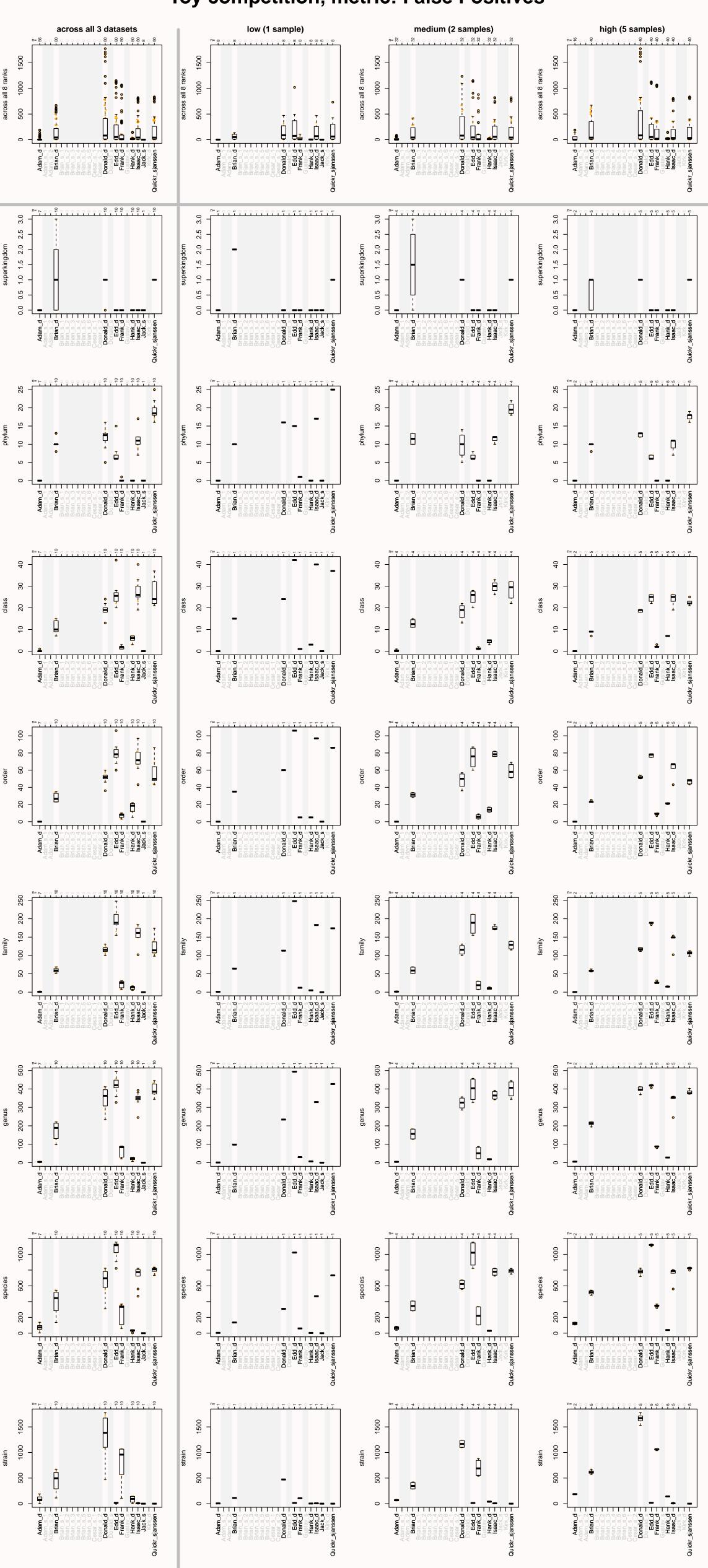


Toy competition, metric: L1norm high (5 samples) across all 3 datasets low (1 sample) medium (2 samples) 1.5 1.5 across all 8 ranks across all 8 ranks across all 8 ranks across all 8 ranks 1.0 1.0 1.0 0.5 0.5 0.5 Ponald d | Donald d | Adam\_d \_ Brian d -Frank d I I Saac S I Jack S I Adam\_d \_ Brian\_d -99999 0.08 0.08 0.08 0.08 90.0 90.0 90.0 0.00 superkingdom superkingdom superkingdom superkingdom 0.04 0.04 0.04 0.04 Ť 0.02 0.02 0.02 0.02 B ₽ 0.00 0.00 0.00 0.00 Frank\_d Hank d I Donald\_d ⊢ Donald\_d -Fank dd d Brian Donald\_d Frank\_d Brian\_d Brian\_d 1.5 phylum phylum phylum phylum 1.0 1.0 1.0 1.0 0.5 0.0 Donald\_d -Edd\_d -Frank\_d -Donald\_d Adam\_d Frank\_d Frank d Edd\_d Frank\_d Donald\_d Brian\_d Adam\_d Brian\_d Donald\_d Brian d Brian d 2.0 2.0 1.5 1.5 1.5 1.5 class class class 0.1 0.1 0.1 1.0 В Brian\_d -Adam\_d . Frank\_d Edd\_d Frank\_d Frank\_d Fiank dd d d Brian\_d Donald Donald Brian Donald order 1.0 1.0 1.0 1.0 Brian d Donald\_d Donald\_d Frank\_d 1.5 1.5 family family 1.0 1.0 1.0 Donald d --Conald d --Conald d --Edd d --Sustank d --Hank d --Isaac d --Jack s ---Hank\_d-Isaac\_d-Donald\_d Donald\_d Donald\_d 1.5 ₽ 1.5 genus 1.0 1.0 1.0 1.0 Donald d Loop of Loop Donald d | Edd d | Frank d | Brian\_d Brian\_d Brian\_d 1.5 1.5 species species 0.1 1.0 0.1 ₿ 0.5 0.5 Donald\_d -Donald\_d -Frank dd. d Frank Brian\_d Donald\_d 1.2 1.2 1.2 1.2 Brian d Frank Brian d Edd\_d Frank\_d Adam\_d Brian\_d Brian\_d Adam significance level 90%, 1000 iterations for the following background models: true number of species, drawn from all 328832 bacterial species in NCBI, abundances from log-normal(mu=1.0,sigma=2.0) true number of species, drawn from all ever prediced species (6848), abundances from log-normal(mu=1.0,sigma=2.0) true strains, true but shuffled abundances

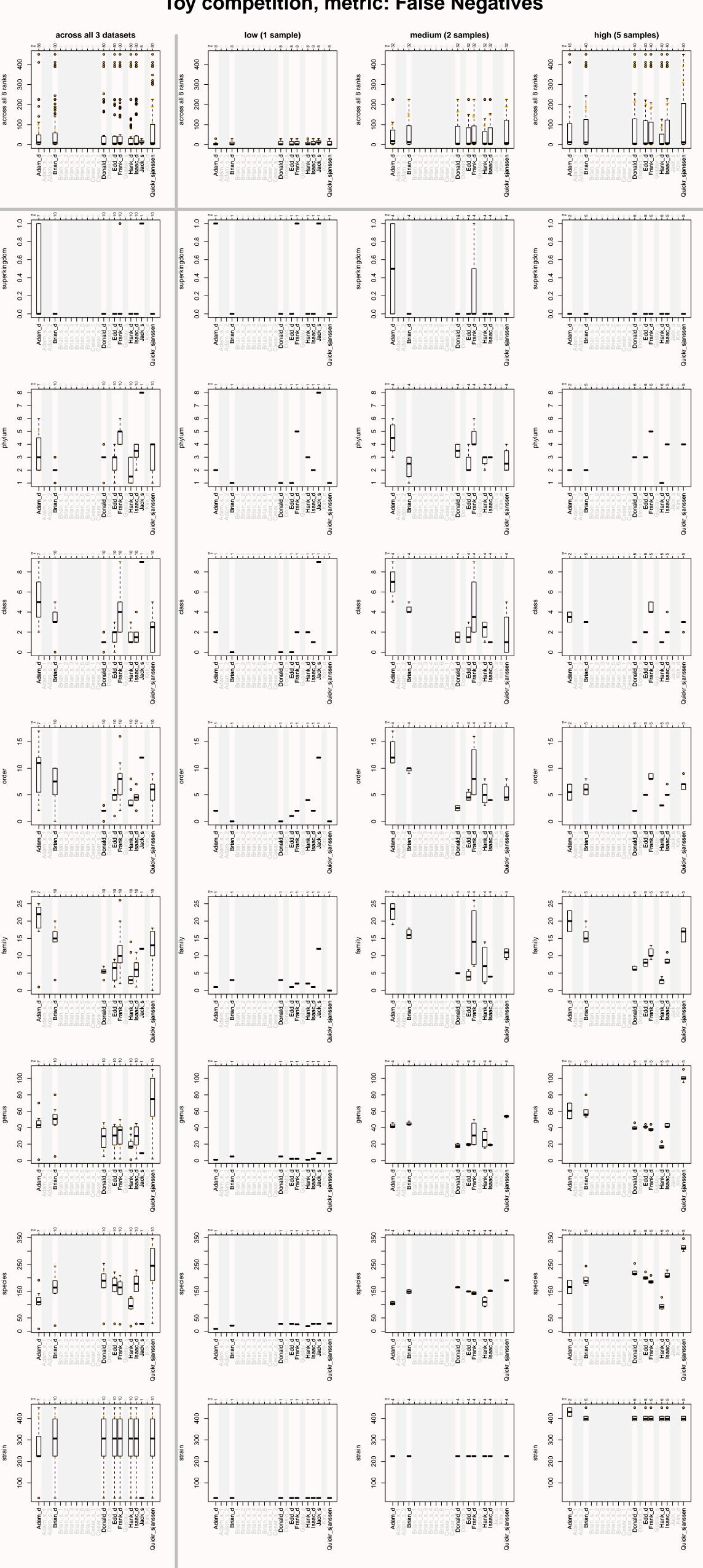
### Toy competition, metric: Sensitivity low (1 sample) medium (2 samples) across all 3 datasets high (5 samples) 0.8 0.8 0.8 0.8 across all 8 ranks across all 8 ranks across all 8 ranks across all 8 ranks 9.0 9.0 0.4 0.4 0.4 0.2 0.2 0.2 Prank d Ponald d Donald d Edd d Frank d Hank d Isaac s Jack s Frank d | L Donald 0.9 6.0 0.9 0.9 superkingdom superkingdom superkingdom superkingdom 0.8 0.8 0.8 0.7 0.7 0.7 0.7 9.0 9.0 9.0 0.5 0.5 Frank\_d Donald\_d Donald\_d Bia Brian Brian Donald $\blacksquare$ 9.0 9.0 9.0 9.0 phylum phylum phylum phylum 9.0 0.4 9.7 0.4 Donald\_d Edd\_d Frank\_d Donald d Edd d Frank d Hank d Isaac d Jack s Frank d Frank\_d Donald\_d Donald\_d 0.8 9.0 9.0 9.0 9.0 class class 0.4 0.4 0.4 Adam\_d -Edd d Frank d Brian d Adam\_d . Edd\_d Frank\_d Donald\_d Donald Brian order 9.0 0.4 Frank\_d Frank Brian\_d — Brian\_d -Donald\_d -Hank\_d |saac\_d-Jack\_s -Donald\_d -Hank\_d -Isaac\_d -Frank\_d Brian d 9.0 family family 9.0 9.0 9.0 9.4 0.4 9.4 Donald d Edd d Frank d Hank d Isaac d Jack s Frank d Hank d H Donald d | Edd d | Frank d | Hank d | Isaac d | Donald\_d -Frank d Brian d Donald\_d Quickr\_sjanssen 9.0 genus 0.4 Donald d - Donald d - Crark d Fank d Adam\_d dam\_s\_1 dam\_s\_2 Brian\_d Adam\_d — dam\_s — dam\_s 2 — Brian\_d — Adam\_d d dam\_s 1 dam\_s 2 dam\_s 2 dam\_s 2 dam\_s 2 dam\_s 2 dam\_d dam\_s 2 dam\_d d Quickr\_sjanssen ₽ 0.7 0.5 0.5 species species species Donald d | Edd d | Frank d | Donald d Frank\_d | Frank Donald\_d -Brian d Brian\_d -0.5 -0.5 -1.0 -1.0 -1.0 -1.0 Donald d Donald d Donald d Edd d Frank d Hank d Isaac d Jack s Auck s Brian\_d -Frank d - Hank d - Isaac d Adam\_d -Donald\_d -Donald\_d

### Toy competition, metric: Precision across all 3 datasets low (1 sample) medium (2 samples) high (5 samples) 0.8 0.8 0.8 0.8 across all 8 ranks across all 8 ranks across all 8 ranks across all 8 ranks 9.0 9.0 0.4 0.4 0.2 0.2 0.2 0.2 Ì Prank d Donald d - Donald S - Adam\_d \_ 0.8 0.8 0.8 superkingdom superkingdom superkingdom 0.8 superkingdom 0.6 0.7 0.7 0.7 0.7 9.0 9.0 9.0 0.5 0.5 0.5 0.4 Frank\_d Brian d Frank Frank d Brian\_d Donald d Donald\_d Donald\_d Bia 0.8 0.8 0.8 0.8 phylum phylum phylum phylum 9.0 0.4 Donald d Donald S Edd d Frank d Frank\_d Donald\_d Frank\_d Donald\_d Frank Donald\_d 0.8 class ₫ 9.0 Ē 0.4 0.4 0.4 0.4 Hank\_d --Isaac\_d --Jack\_s --Adam\_d -Brian\_d Frank Edd\_d Frank\_d Donald\_d Brian Brian Donald Adam Brian 9.0 9.0 order Ţ 0.4 9.0 0.4 0.2 0.2 Frank d Frank\_d Brian\_d — Brian\_d -Frank Frank Frank Hank d - Isaac\_d - Isaac\_d -Donald\_d -Donald\_d -Frank d Brian d Donald\_d j family family Ď 0.4 0.4 0.4 Donald & Don Donald de la Frank de la Lank de Frank d Frank d Hank d H Brian\_d Brian d Brian d Brian d Adam\_d 0.8 genus genus 0.4 0.4 0.2 ₿ 0.0 Donald d - Carlo and a carlo a Adam\_d -Ponald d Donald d Donald d Frank d Frank d Hank d Saac d Jack s Adam\_d dam\_s\_l dam\_s\_l Brian\_d Brian\_d -Brian\_d -Adam\_d dam\_s\_d dam\_s\_l Brian\_d 0.8 9.0 9.0 9.0 species species 0.4 0.4 Donald d + The Bonald S + The Bonald 0.2 0.2 0.2 Donald S Donald C — Edd C — Frank C — Hark C — Isaac C — Frank\_d\_L Brian d Donald\_d Brian\_d -Brian Adam\_d Brian d -0.5 -0.5 -0.5 -1.0 -1.0 -1.0 -1.0 Donald d Donald d Donald d Edd d Frank d Hank d Saac d Edd\_d Edd\_d Frank\_d Hank\_d Isaac\_d Brian\_d -Adam\_d -Donald\_d -

# Toy competition, metric: False Positives



# Toy competition, metric: False Negatives



### Toy competition, metric: True Positives medium (2 samples) across all 3 datasets low (1 sample) high (5 samples) 250 250 200 200 200 across all 8 ranks across all 8 ranks across all 8 ranks 150 150 150 100 100 100 20 20 Donald d – Donald S – Edd d – Frank d – Frank\_d -Hank d Frank Hank Isaac Jack 6. 6. 6. superkingdom superkingdom superkingdom 1.6 1.6 1.6 4. 4. 1.2 1.2 1.0 Frank\_d Fard Add D Frank\_d Brian\_d Donald\_d Brian\_d Donald\_d Donald d Bia 15 15 phylum phylum phylum 10 10 10 2 2 2 Donald d Edd d Frank d Donald\_d Frank d Frank d Frank\_d Donald\_d Donald\_d 30 Ħ ļ 25 25 25 20 20 20 class 15 15 15 10 10 10 Frank Adam\_d Frank\_d Fiank dd d d Edd\_d Frank\_d Donald\_d Donald Brian 9 9 ļ 20 20 20 40 40 40 order order 30 30 30 20 20 20 10 10 10 Frank\_d Brian\_d — Donald\_d -Brian\_d -Hank\_d -Isaac\_d -Brian d Frank Donald\_d . Frank\_d Donald\_d Adam\_d Quickr\_sjanssen 100 100 100 80 80 80 family family 9 9 9 40 40 40 20 20 20 Tank Saac d Saac d LIIII Donald d L Frank d Hank d H Donald\_d -Frank d Brian d Brian d Quickr\_sjanssen Adam\_d Quickr\_sjanssen 150 150 150 100 100 100 genus genus **—** 20 20 20 Donald d - Donald d - Donald d - Edd\_d - Frank\_d - Hank\_d - Base\_d Donald d | Edd\_d | Frank\_d | Hank\_d | Isaac\_d Ponald d | Edd\_d | Frank\_d | Hank\_d | Isaac\_d Adam\_d ddam\_s\_1 ddam\_s\_2 Brian\_d Brian\_d -Ponald d | Donald d | Quickr\_sjanssen -250 200 200 200 150 150 150 species species species 100 100 100 50 20 50 Donald d Don Donald d Edd\_d Frank\_d Brian\_d — Donald\_d -Frank\_d Donald\_d -Frank\_d Adam\_d Brian\_d Brian\_d

200

150

<del>2</del>.

1.6

1.2

superkingdom

phylum

10

2

20

10

30

20

10

80

9

40

20

150

100

-0.5

-1.0

Adam\_d -

Brian\_d

Adam\_d -

Brian d

-0.5

-1.0

Donald d Donald d Donald d Edd d Frank d Hank d Saac d

Adam\_d - dam\_s\_1 - dam\_s\_1 - Brian\_d -

Adam\_d d dam\_s\_1 dam\_s\_2 Brian\_d d

family

Brian\_d -

Adam\_d

Adam\_d -

class 15 Adam\_d -

Adam\_d \_

across all 8 ranks

