WHAT IS CLAIMED IS:

1. A method for aiding in the diagnosis of irritable bowel syndrome (IBS) and/or a clinical subtype thereof in a subject, said method comprising:

(a) detecting in a sample a panel of markers to rule-out a diagnosis of inflammatory bowel disease and celiacs disease (CD); and

(b) detecting in said sample a panel of markers to rule-in a diagnosis of IBS.

2. The method of claim **1**, wherein said method comprises obtaining one or more of the following (a) through (h) scores:

(a) detecting in said sample obtained from said subject the presence or absence of an anti-gliadin IgA antibody, an anti-gliadin IgG antibody, an anti-tissue transglutaminase (tTG) antibody, and an anti-endomysial antibody to obtain a celiac disease (CD) score;

(b) detecting in said sample the presence or level or genotype of at least each of the following markers to obtain an inflammatory bowel disease (IBD) score:

(i) the presence or level of each of the serological markers ASCA-A, ASCA-G, ANCA, pANCA, anti-OmpC antibody, anti-CBir1 antibody, anti-FlaX antibody, and anti-A4-Fla2 antibody;

(ii) the presence or level of each of the inflammation markers VEGF, ICAM, VCAM, SAA, and CRP; and

(iii) the genotype of each of the genetic markers ATG16L1, ECM1, NKX2-3, and STAT3;

(c) detecting in said sample the level of at least one bacterial antigen antibody marker to obtain a microbiome score;

(d) detecting in said sample the level of at least one mast cell marker to obtain a mast cell score;

(e) detecting in said sample the level of at least one inflammatory cell marker to obtain an inflammatory score;

(f) detecting in said sample the level of at least one bile acid malabsorption (BAM) marker to obtain a BAM score;

(g) detecting in said sample the level of at least one kynurenine marker to obtain an oxidative stress score;

(h) detecting in said sample the level of at least one serotonin marker to obtain a serotonin score;

(i) applying a decision tree or a set of rules to said CD score to obtain a decision whether said sample is a CD sample or a non-CD sample;

(j) if said sample is a non-CD sample, then applying a random forest statistical analysis to said IBD score to obtain a decision whether the sample is an IBD sample or a non-IBD sample;

(k) if said sample is a non-IBD sample, then applying a statistical algorithm to one or more of the following: said microbiome score, said mast cell score, said inflammatory score, said BAM score, said oxidative stress score, and said serotonin score to obtain a disease score; and

(l) determining a diagnosis of IBS in said subject based on a statistical algorithm that generates a probability of having IBS based the disease score and a diagnostic model comprising a microbiome score, a mast cell score, an inflammatory score, a bile acid malabsorption score, an oxidative stress score, and a serotonin score from a retrospective cohort of patients.

3. The method of claim **2**, wherein the at least one bacterial antigen antibody marker is selected from the group consisting of an anti-Fla1 antibody, anti-Fla2 antibody, anti-FlaA antibody, anti-FliC antibody, anti-FliC2 antibody, anti-FliC3 antibody, anti-YBaN1 antibody, anti-*ECF*liC antibody, anti-*Ec0*FliC antibody, anti-*Sc*FljB antibody, anti-*Cj*FlaA antibody, anti-*Cj*FlaB antibody, anti-*Sf*FliC antibody, anti-*Cj*CgtA antibody, anti-*Cj*dmh antibody, anti-*Cj*GT-A antibody, anti-*Ec*YidX antibody, anti-*Ec*Era antibody, anti-*Ec*FrvX antibody, anti-*Ec*GabT antibody, anti-*Ec*YedK antibody, anti-*Ec*YbaN antibody, anti-*Ec*YhgN antibody, anti-*Rt*Maga antibody, anti-*Rb*CpaF antibody, anti-*Rg*PilD antibody, anti-*La*Frc antibody, anti-*La*Eno antibody, anti-*Lj*EFTu antibody, anti-*Bf*Ompa antibody, anti-*Pr*OmpA antibody, anti-*Cp*10bA antibody, anti-*Cp*SpA antibody, anti-*Ef*Sant antibody, anti-*Lm*Osp antibody, anti-*Sf*ET-2 antibody, anti-*Cp*atox antibody, anti-*Cp*btox antibody, anti-*Ec*Sta2 antibody, anti-*Ec0*Stx2A antibody, anti-*Cj*cdtB/C antibody, anti-*Cdt*cdA/B antibody, and combinations thereof.

4. The method of claim **2**, wherein the at least one mast cell marker is selected from the group consisting of β-tryptase, histamine, prostaglandin E2 (PGE2), and combinations thereof.

5. The method of claim **2**, wherein the at least one inflammatory marker is selected from the group consisting of CRP, ICAM, VCAM, SAA, GROα, and combinations thereof.

6. The method of claim **2**, wherein the at least one bile acid malabsorption marker is selected from the group consisting of 7α-hydroxy-4-cholesten-3-one, FGF19, and a combination thereof.

7. The method of claim **2**, wherein the at least one kynurenine marker is selected from the group consisting of kynurenine (K), kynurenic acid (KyA), anthranilic acid (AA), 3-hydroxykynurenine (3-HK), 3-hydroxyanthranilic acid (3-HAA), xanthurenic acid (XA), quinolinic acid (QA), tryptophan, 5-hydroxytryptophan (5-HTP), and combinations thereof.

8. The method of claim **2**, wherein the at least one serotonin markers is selected from the group consisting of serotonin (5-HT), 5-hydroxyindoleacetic acid (5-HIAA), serotonin-O-sulfate, serotonin-O-phosphate, and combinations thereof.

9. The method of claim **2**, wherein the diagnostic model is established using a retrospective cohort with known outcomes of IBS and healthy controls.

10. The method of claim **2**, wherein the diagnostic model is established using a retrospective cohort with known outcomes of a clinical subtype of IBS and healthy controls.

11. The method of claim **2**, wherein the method further comprises classifying a diagnosis of IBS as IBS-constipation (IBS-C), IBS-diarrhea (IBS-D), IBS-mixed (IBS-M), IBS-alternating (IBS-A), or post-infectious (IBS-PI).

12. The method of claim **2**, wherein the level of said bacterial antigen antibody marker, said mast cell marker, said inflammatory cell marker, said BAM marker, said kynurenine marker or said serotonin marker is independently detected with a hybridization assay, amplification-based assay, immunoassay, immunohistochemical assay, or a mobility assay.

~~**13**. The method of claim **12**, wherein the hybridization assay comprises an ELISA or a CEER™ assay.~~

~~**14**. The method of claim **2**, wherein the sample is selected from the group consisting of whole blood, plasma, serum, saliva, urine, stool, tears, any other bodily fluid, a tissue sample, and a cellular extract thereof.~~

~~**15**. The method of claim **14**, wherein the sample is serum.~~

~~**16**. The method of claim **2**, wherein at least two members selected from the following group are measured: microbiome score, a mast cell score, an inflammatory score, a bile acid malabsorption score, an oxidative stress score, and a serotonin score.~~

~~**17**. The method of claim **16**, wherein at least three members selected from the following group are measured: microbiome score, a mast cell score, an inflammatory score, a bile acid malabsorption score, an oxidative stress score, and a serotonin score.~~

~~**18**. The method of claim **16**, wherein at least four members selected from the following group are measured: microbiome score, a mast cell score, an inflammatory score, a bile acid malabsorption score, an oxidative stress score, and a serotonin score.~~

~~**19**. The method of claim **16**, wherein at least five members selected from the following group are measured: microbiome score, a mast cell score, an inflammatory score, a bile acid malabsorption score, an oxidative stress score, and a serotonin score.~~

~~**20**. The method of claim **16**, wherein all members of the following group are measured: microbiome score, a mast cell score, an inflammatory score, a bile acid malabsorption score, an oxidative stress score, and a serotonin score.~~

1~~21~~. A method for aiding in the diagnosis of irritable bowel syndrome (IBS) and/or a clinical subtype thereof in a subject, said method comprising obtaining at least two ~~one or more~~ of the following (a) through (f) scores:

(a) detecting in a sample obtained from said subject the level of at least one bacterial antigen antibody marker to obtain a microbiome score;

(b) detecting in said sample the level of at least one mast cell marker to obtain a mast cell score;

(c) detecting in said sample the level of at least one inflammatory cell marker to obtain an inflammatory score;

(d) detecting in said sample the level of at least one bile acid malabsorption (BAM) marker to obtain a BAM score;

(e) detecting in said sample the level of at least one kynurenine marker to obtain an oxidative stress score;

(f) detecting in said sample the level of at least one serotonin marker to obtain a serotonin score;

(g) applying a statistical algorithm to the at least two of said microbiome score, said mast cell score, said inflammatory score, said BAM score, said oxidative stress score, and said serotonin score to obtain a disease score; and

(h) determining a diagnosis of IBS in said subject based on a statistical algorithm that generates a probability of having IBS based the disease score and a diagnostic model comprising at least two of a microbiome score, a mast cell score, an inflammatory score, a bile acid malabsorption score, an oxidative stress score, ~~and~~ a serotonin score and combinations thereof from a retrospective cohort.

2~~22~~. The method of claim 1~~21~~, wherein the at least one bacterial antigen antibody marker is selected from the group consisting of an anti-Fla1 antibody, anti-Fla2 antibody, anti-FlaA antibody, anti-FliC antibody, anti-FliC2 antibody, anti-FliC3 antibody, anti-YBaN1 antibody, anti-*EC*FliC antibody, anti-*Ec0*FliC antibody, anti-*Se*FljB antibody, anti-*Cj*FlaA antibody, anti-*Cj*FlaB antibody, anti-*Sf*FliC antibody, anti-*Cj*CgtA antibody, anti-*Cj*dmh antibody, anti-*Cj*GT-A antibody, anti-*Ec*YidX antibody, anti-*Ec*Era antibody, anti-*Ec*FrvX antibody, anti-*Ec*GabT antibody, anti-*Ec*YedK antibody, anti-*Ec*YbaN antibody, anti-*Ec*YhgN antibody, anti-*Rt*Maga antibody, anti-*Rb*CpaF antibody, anti-*Rg*PilD antibody, anti-*La*Frc antibody, anti-*La*Eno antibody, anti-*Lj*EFTu antibody, anti-*Bf*Ompa antibody, anti-*Pr*OmpA antibody, anti-*Cp*10bA antibody, anti-*Cp*SpA antibody, anti-*Ef*Sant antibody, anti-*Lm*Osp antibody, anti-*Sf*ET-2 antibody, anti-*Cp*atox antibody, anti-*Cp*btox antibody, anti-*Ec*Sta2 antibody, anti-*Ec0*Stx2A antibody, anti-*Cj*cdtB/C antibody, anti-*Cd*tcdA/B antibody, and a combination thereof.

3~~23~~. The method of claim 1~~21~~, wherein the at least one mast cell marker is selected from the group consisting of β-tryptase, histamine, prostaglandin E2 (PGE2), and combinations thereof.

4~~24~~. The method of claim 1~~21~~, wherein the at least one inflammatory marker is selected from the group consisting of CRP, ICAM, VCAM, SAA, GROα, and combinations thereof.

5~~25~~. The method of claim 1~~21~~, wherein the at least one bile acid malabsorption marker is selected from the group consisting of 7α-hydroxy-4-cholesten-3-one, FGF19, and a combination thereof.

6~~26~~. The method of claim 1~~21~~, wherein the at least one kynurenine marker is selected from the group consisting of kynurenine (K), kynurenic acid (KyA), anthranilic acid (AA), 3-hydroxykynurenine (3-HK), 3-hydroxyanthranilic acid (3-HAA), xanthurenic acid (XA), quinolinic acid, tryptophan, 5-hydroxytryptophan (5-HTP), and combinations thereof.

7~~27~~. The method of claim 1~~21~~, wherein the at least one serotonin marker is selected from the group consisting of serotonin (5-HT) and 5-hydroxyindoleacetic acid (5-HIAA), serotonin-O-sulfate, serotonin-O-phosphate, and combinations thereof.

8~~28~~. The method of claim 1~~21~~, wherein the diagnostic model is established using a retrospective cohort with known outcomes of IBS and healthy controls.

9~~29~~. The method of claim 1~~21~~, wherein the diagnostic model is established using a retrospective cohort with known outcomes of a clinical subtype of IBS and healthy controls.

10~~30~~. The method of claim 1~~21~~, wherein the method further comprises classifying a diagnosis of IBS as IBS-constipation (IBS-C), IBS diarrhea (IBS-D), IBS-mixed (IBS-M), IBS-alternating (IBS-A), or post-infectious (IBS-PI).

11~~31~~. The method of claim 1~~21~~, wherein the level of said bacterial antigen antibody marker, said mast cell marker, said inflammatory cell marker, said BAM marker, said kynurenine marker or said serotonin marker is independently detected with a

hybridization assay, amplification-based assay, immunoassay, immunohistochemical assay, or a mobility assay.

12~~32~~. The method of claim **11**~~31~~, wherein the hybridization assay comprises an ELISA or a CEER™ assay.

~~33. The method of claim 21, wherein at least two members selected from the following group are measured: microbiome score, said mast cell score, said inflammatory score, said BAM score, said oxidative stress score, and said serotonin score.~~

13~~34~~. The method of claim **1**~~33~~, wherein at least three members selected from the following group are measured: microbiome score, a mast cell score, an inflammatory score, a bile acid malabsorption score, an oxidative stress score, and a serotonin score.

14~~35~~. The method of claim **13**~~33~~, wherein at least four members selected from the following group are measured: microbiome score, a mast cell score, an inflammatory score, a bile acid malabsorption score, an oxidative stress score, and a serotonin score.

15~~36~~. The method of claim **13**~~33~~, wherein at least five members selected from the following group are measured: microbiome score, a mast cell score, an inflammatory score, a bile acid malabsorption score, an oxidative stress score, and a serotonin score.

16~~37~~. The method of claim **13**~~33~~, wherein all members of the following group are measured: microbiome score, a mast cell score, an inflammatory score, a bile acid malabsorption score, an oxidative stress score, and a serotonin score.

17. The method of claim **1**, wherein the at least two members are a bile acid malabsorption score and a serotonin score.